VOL. XIV. No. 23 CHICAGO, DECEMBER 3, 1908 $3.00 PER YEAR

MOTOR AGE

DOUBLE VICTORY AT SAVANNAH FOR ITALY

Fiat, driven by Wagner, wins the American Grand Prix from the most brilliant field that ever started in a motor car road racing event in the United States.

Lancia, driven by Hilliard, first in the light car race in which it defeats representatives of three nations and maintains an average speed of 52.6 miles per hour.

American Grand Prix Finishers

No.	Car	Driver	M. P. H.
1	Fiat	Wagner	65.1
2	Benz	Hemery	64.9
3	Fiat	Nazzaro	63.6
4	Benz	Hanriot	62.3
5	Clement	Hautvast	61.2
6	Renault	Strang	59.7
7	Clement	Rigal	59.3
8	Itala	Fournier	59.3
9	Fiat	de Palma	58.6

Distance of Race, 402 miles
Distance of Lap. 25.13 miles
Fastest Lap, de Palma - - - - - - 69.7 m.p.h.
Number of Starters, 20
Number of Finishers, 9

Light Car Race Finishers

No.	Car	Driver	M. P. H.
1	Lancia	Hilliard	52.6
2	Buick	Burman	51.1
3	Chalmers	Lorimer	50.2
4	Buick	Hearne	49.2
5	Isotta	Poole	46,7
6	Maxwell	See	45.5
7	Maxwell	Kelsey	45.1

Distance of Race, 196 miles
Distance of Lap, 9.8 miles
Fastest Lap, Lorimer - - - - - - 57.6 m.p.h.
Number of Starters, 15
Number of Finishers, 7

L. WAGNER W. M. HILLIARD

WAGNER IN FIAT WINS GRAND PRIZE FOR ITALY

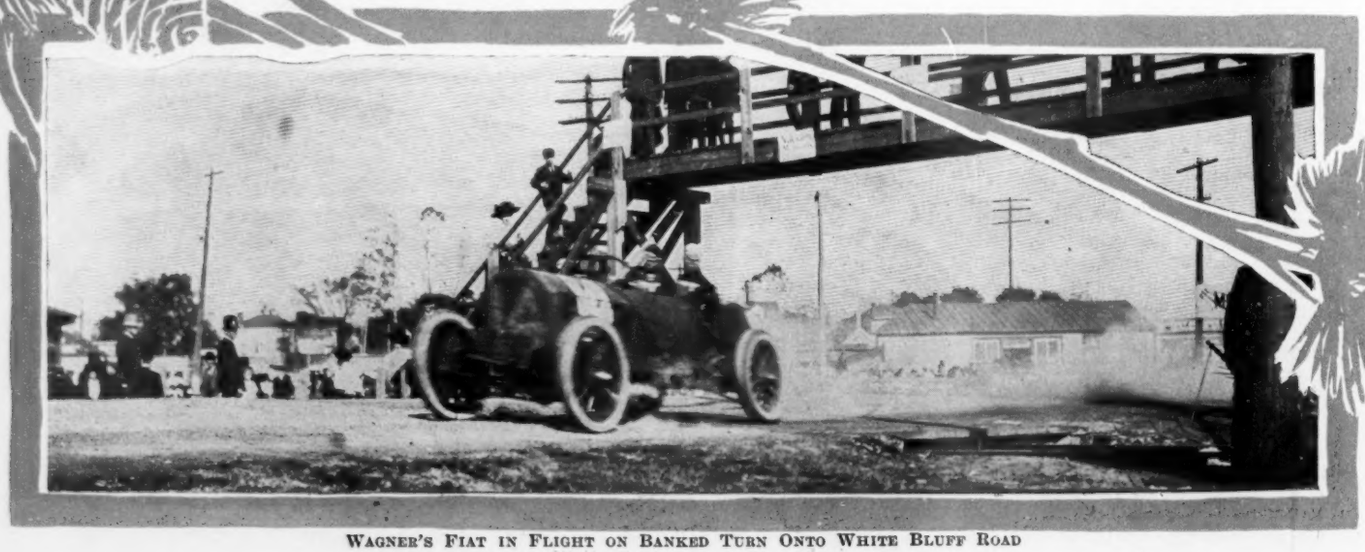
HEMERY'S PONDEROUS BENZ SWINGING AROUND A TURN

SAVANNAH, GA., Nov. 26—Italy today won America's first grand prix race of 402 miles over a 25.13-mile circuit on the outskirts of this city, Louis Wagner, the hero of the 1906 Vanderbilt cup race, being the winning driver, piloting his Fiat racing car over the sixteen laps at an average pace of 65.1 miles per hour and beating his nearest rival, Victor Hemery, by the narrow margin of 56 seconds. Hemery, in his big Benz racing machine that triumphed over the Fiats in the French grand prix race this year, was a strong favorite and undoubtedly he would have won the race by a few seconds had he not been wrongly instructed by his signal corps as to the proximity of Wagner. As it was he averaged 64.9 miles per hour. Third honors also went to Italy, Felice Nazzaro carrying them off with another Fiat, which averaged 63.6 miles per hour for the circuit. Up till the last lap Nazzaro was the big favorite and was leading by a margin of 2 minutes, but a couple of tire changes crushed every hope of his admirers. Fourth honors went to another Benz car driven by Hanriot with an average pace of 62.3 miles per hour to his credit. Hautvast, driving a Clement car, annexed fifth position; Lewis Strang, the hero of last March's races over the same course under A. A. A. auspices, was sixth in a Renault; Rigal, in a Clement, was seventh; Henri Fournier, in an Itala, eighth, and Ralph de Palma, in the third Fiat, ninth and last car to finish.

Only Nine Cars Finish

Only these nine cars finished the race before it was called off but three other cars were running, two American machines, Seymour in his Simplex and Mulford in a Lozier, together with the French driver Duray in his de Dietrich. Eight cars failed to finish the course, four of these being foreign machines and four American cars. Cagno in his Itala broke a rear spring in the tenth lap; Szisz broke a ball in a wheel bearing of his Renault in the seventh; Piacenza in his Itala ran off the course in the fifth and went out; Fritz Erle had an accident in the eleventh, wrecking his car on the White Bluff road; the Acme broke a front spring in the third and retired in the seventh; Burman's Buick ran off the course in the third lap and retired; Haupt in the Chadwick had lubrication troubles and retired in the fifth, and the National driven by Harding had camshaft difficulties and withdrew in the twelfth. So ended the race, nine foreign cars finishing, no American machines completing the sixteen laps, twelve of the twenty cars that started running at the finish and six dropped before the end came.

It was not an American day in spite of the glorious sunshine of the south that brightened everything after the start of the race which was a duel from start to finish between the Italian Fiat cars and the Benz machines from Germany. There were three in each team and the machines were manned by the best drivers Europe can produce. These teams had met before this year on Europe's roads where the Benz had won the day and the Fiat team



WAGNER'S FIAT IN FLIGHT ON BANKED TURN ONTO WHITE BLUFF ROAD

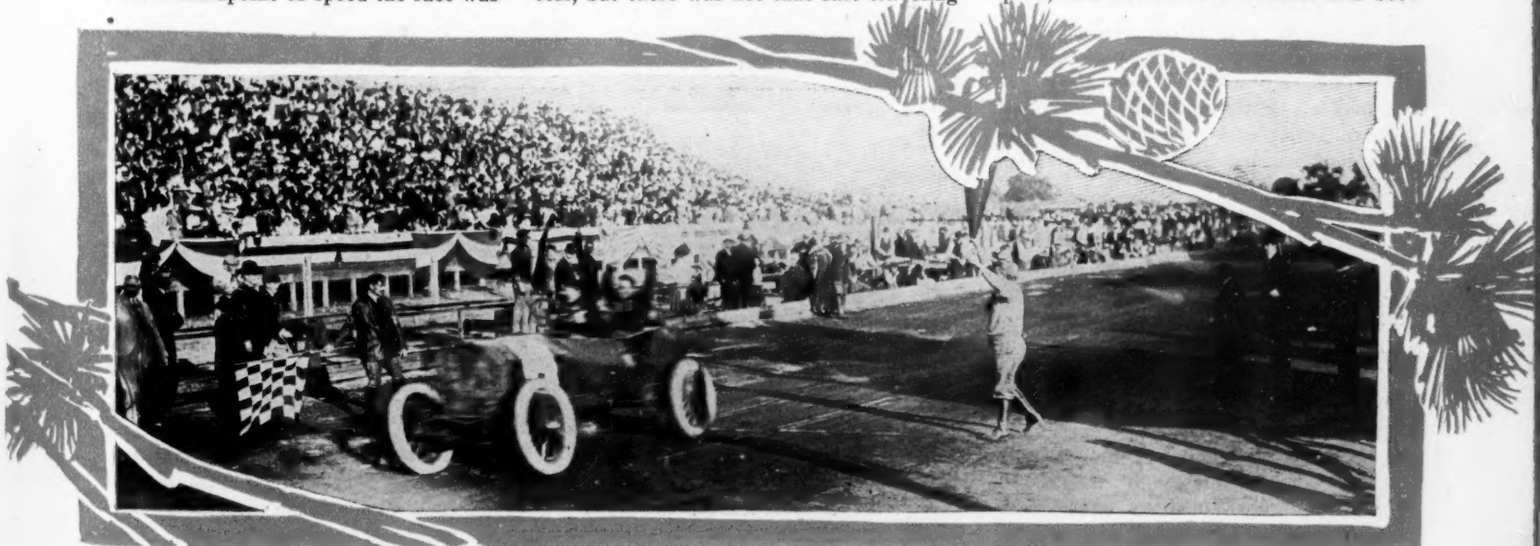
WITH HEMERY IN GERMAN BENZ CLOSE SECOND

NAZZARO IN FIAT, AND WAGNER AFTER THE FINISH

was ready for the fray, determined to fight to the death to win back lost laurels. As results proved, the day went to the Roman descendants, who won first and third places, while Germany was given second and fourth. After the first few laps the Fiat team was practically reduced to a two-man affair by the troubles with oiling that de Palma encountered. As if to even matters up for the grand final act of the closing laps Fritz Erle in one of the Benz cars, dropped out in the tenth lap when he was running in fourth place.

American cars lost for two reasons—they were not ready for the race and were underpowered. National, Acme, Chadwick and Buick put in stock machines, Lozier had a new racing car that was fresh from the factory with not enough running to put it in shape and the Simplex had been altered before reaching Savannah simply by adding larger cylinders to the stock chassis. As the race proved, it is useless for medium-powered stock machines to compete with high-grade racing locomotives built by the foreigners and by the performance of which the status of the motor car industry in their countries is gauged. If America hopes to promote international races next year and expects the cream of the racing talent from across the water to compete it must build cars to meet the foreigner and not make a ridiculous showing by entering in a half-hearted, half-prepared condition and not finishing the course. The performance made by American cars in contrast with the work shown by the foreigners is not a true estimate of the standard of the American cars. The foreigners were ready to race a week beforehand; the Americans were not ready when Starter Wagner gave the signal at 9:45 this morning.

From a standpoint of speed the race was a disappointment to many of the Savannahans, who had played heavily on a 70-mile-an-hour clip. But there was no reason for placing such a high estimate, as only one or two laps at this clip were made in practice and in the race itself. The many turns killed fast traveling and as predicted in Motor Age a week ago the pace was slightly in advance of 65 miles an hour. The course was in the best condition it was possible to put it in with the exception of a little too much oil in places which to a degree had been rectified by strewing sand over the course the day before. The banked turns were a success, but there was not that fast traveling on them that the multitude had expected. None of the drivers with the exception of de Palma in his Fiat and Hanriot in his Benz, did phenomenally fast work, all of them preferring to drive mediumly fast and not be stopping every other lap to change tires. Felice Nazzaro, the speed king of Europe and who averaged 74.25 miles per hour over the Florio cup race this year, did not take one of the turns fast, but shut off and coasted around them, with the result that he traveled over 375 miles without having to change a tire. On the other hand Hanriot and de Palma, who started out with space-devouring speed, had endless tire troubles and both



WAGNER'S FIAT COMPLETING LAST LAP AND WINNING THE RACE

of them had difficulties with the lubrication of the motor.

Foreigners Are Cautious

Viewed by the many, the race was not a death struggle at the start: The foreigners had not been accustomed to 400-mile races and it was apparent they had figured out very carefully beforehand the folly of going out to kill it right from the start. It did look, however, as if the Benz team as well as the Fiat trio had determined upon sending one man out to tear the road up from the start, de Palma and Hanriot being the selections. Should this prove to be the case the result of the effort shows how hopelessly futile it was.

HANRIOT GOING AT 100 MILES AN HOUR

DE PALMA'S FIAT ON FERGUSON AVENUE

The Automobile Club of Savannah, the Savannah Chamber of Commerce and other governing bodies of the city did themselves proud in the preparation of the course and the management of the race. Over $50,000 had been expended in making miles of new road purposely for the course as well as in perfecting the old part of the course and erecting new grand stands. The state militia was in control and every person who wished to cross the course during the race could only do so by showing his military pass to the soldiers, which pass was signed by the mayor of the city and countersigned by the commandant of the militia. With such order it is not surprising that nine cars were allowed to finish over a course absolutely clear from end to end. Nine more could have finished over an equally clear course had the cars been running and the referee decided to allow them to finish. Nothing could have been better and Savannah by duplicating its example of last March has set a mark for the entire world on how a motor road race should be conducted. The course was punctuated with flagmen its entire distance who displayed a red flag for clear course and yellow flag for danger; at convenient points around the 25.13 miles of oiled roadway were eleven telephone booths connecting with a central switchboard on the judges' stand, by means of which the 15,000 spectators in the grand stand were constantly kept informed of the progress of the racers when off the home stretch. Also located at as many places around the course were hospital headquarters with wagons and physicians so that when an accident did happen the doctors were in attendance, in one case within 30 seconds of the happening. These are but a few of the many acts of preparednesses of the Savannahans without which the race would not in any wise have been the success it proved itself to be.

A new feature in connection with the race was the timing of the cars over a measured mile on the home stretch by the Trego automatic timer of the Chicago Motor Club. This timer, under the management of Frank H. Trego, the inventor, took the time of 138 cars as they rushed along the home stretch and on two occasions recorded speeds of 100 miles per hour made twice by Hanriot in his Benz and once by Strang's Renault. On three other occasions Strang beat the 100-mile-an-hour clip, doing the mile in 35.4 seconds, or at a speed of 101.7 miles per hour. The majority of the other cars were content with traveling at from 86 to 98 miles per hour. Wagner's fastest time over this stretch was just 90 miles per hour and Nazzaro did not make the mile once at this pace. Hemery traveled faster over it, running some laps over the measured mile at 95 miles per hour.

DURAY IN DE DIETRICH ROUNDING A CURVE

Compared with Hemery and Nazzaro, Wagner drove an uphill race from start to finish. To begin with, he must have made at least six stops during the sixteen laps, whereas Hemery and Nazzaro made but two each. Four of his stops were made in front of the grand stand at the repair pits in laps three, six, nine and twelve, and he

changed two tires in other parts of the course. His first stop was at the end of lap three, when exactly 50 seconds were needed in throwing off the back of his car a worn tire that he must have taken off a wheel during the lap and in putting a new tire on the rack, which stop, together with that to make the change on the course, made his lap of 24.43 exactly 2 minutes slower than he had been running. In the sixth lap a similar stop was made, but 30 seconds only was used in getting the new tire and throwing away the old one. This lap, owing to changing the tire on the back stretch, was just 2 minutes slower than the pace of 22 minutes and some seconds that he was setting. Lap seven also was slow, the reason for which is not known. In lap nine gasoline and oil were taken on and an old tire thrown off, 1 minute 40 seconds being consumed. In lap twelve there was a 2-minute stop for oil, changing the right front tire and doing some work on the jackshaft. This was the slowest lap of the lot, requiring 26:28. The last three laps were fast ones, in fact three of his four fastest laps: 22:12, 22:11 and 21:59. From these laps it is more than evident he was hitting a terrific pace, knowing full well that it was travel in this way or lose. All told, he lost 5 minutes in front of the grand stand as compared with 50 seconds lost by Nazzaro and 45 by Hemery. Eliminating all tire stops, it is apparent that from start to finish he drove at a pace approximately 22 minutes 20 seconds to the lap, making an average of 67 miles per hour without stops.

It would scarcely be expected that a race of such consequence as the grand prix would pass off without a symptom of discontent. Scarcely had the spectators reached the hotels than rumors of a protest against Nazzaro were afloat. The manager of the Benz camp protested, claiming he received aid in changing two tires in the last lap on the White Bluff road. Nazzaro admitted that the spectators aided in jacking up the car and in pushing it when he started, but also claimed that he tried to stop them, even going so far as to shove them away, but without success. After a hearing the protest was withdrawn. Scarcely had the last echoes of it died before a formal protest was lodged against Hanriot, who won fourth place. Hanriot ran out of gasoline just at the finishing line, having to coast over, but it also appears that he ran out at the upper end of the home stretch and borrowed some from a White steamer. This action would be sufficient to disqualify him, as the rules state that taking on gasoline or oil at other points than the grand stand pits would be penalized. The findings of the referee in the hearing have not yet been made known.

The facts regarding Hemery's losing the race through a slip by his signal corp are briefly as follows: Hemery started 2 minutes after Nazzaro and never caught him until the last lap, but the two raced so closely together that the signals Hemery got each time he flashed past the grand stand were with regard to his standing with respect to Nazzaro. At the end of lap fifteen he got the signal 2-2-6, meaning he was in second place, 2 minutes behind car No. 6, which was Nazzaro, but nothing was said about Wagner, who started 6 minutes behind Hemery, and who was behind him on the course. As it was, Wagner finished lap fifteen only 2 seconds back of Hemery, but Hemery having passed the grand stand had no intelligence of it, and when in the last lap he overtook Nazzaro, he thought his big task was over and he had little to do but beat him out to the finishing line. In the meantime, Wagner's hot pace had overtaken Hemery.

When Hemery passed the grand stand he was greeted a winner and cheered to the

WAGNER TAKES CURVES FAST

MILFORD IN LOZIER ROUNDING A CURVE

HAUVAST IN CLEMENT, WHO FINISHED FIFTH

F. H. Trego with His Timer and Telephone System

BEST TIME EACH LAP

Lap and driver	Time	M.P.H.
1—De Palma	22:18	67.6
2—De Palma	21:36	69.7
3—Hemery	22:03	68.3
4—De Palma	21:48	69.1
5—Szisz	22:22	67.3
6—Hanriot	21:52	68.9
7—De Palma	21:36	69.7
8—Wagner	21:50	69
9—Hemery	22:32	66.9
10—Wagner	22:11	67.9
11—Wagner	22:05	68.2
12—Nazzaro	22:52	66.5
13—Nazzaro	22:38	66.6
14—Wagner	22:12	67.9
15—Wagner	22:11	67.9
Strang	22:11	67.9
16—Hautvast	21:53	68.9

echo, as he rushed by, never slackening on the course to the scales. A little waiting followed, then the spectators realized Wagner had a big chance, which he took.

Michelin had the lion's share of the tire equipment, having fifteen of the twenty cars fitted with his tires. Dunlop tires were fitted on the two Clement-Bayards, and the de Detrich, and Continentals on the Lozier and Simplex. The popular size for the rear wheels was 35.23 inches by 5.31, the Fiats, Benzes, Italas, Clements, de Dietrich, National, Simplex and Renaults using this size. The majority of these cars used 34.44 by 4.13-inch sizes on the front wheels. The Clements had very small front wheel tires, 34¼ by 3½, and it is interesting to note that not a change was made on the front wheels of these cars during the race.

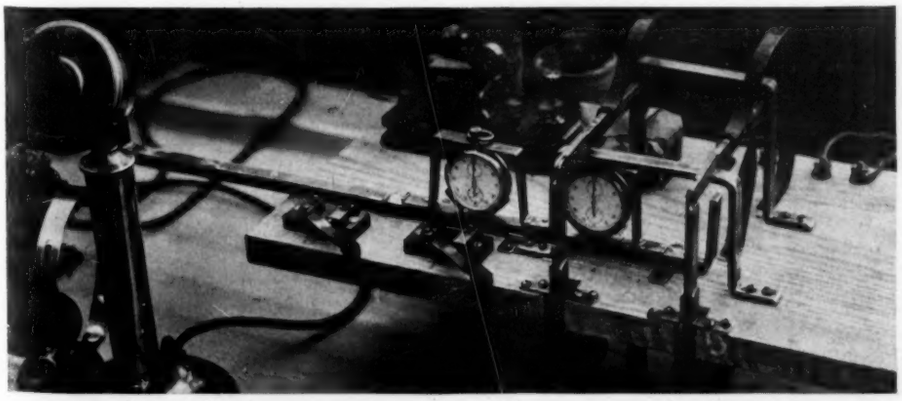
The majority of the cars carrying Michelin tires used the new Michelin split rim, in which the ends of the rim are united by a turn buckle, which is tightened to fasten the rim and slackened to remove it. On the Clements and de Dietrich the rear wheels wer eshod with the new Dunlop rim, which is the fastest on the market. The Continental rim was used on the Lozier and Simplex. Practically all of the cars began the race with studded treads, the heavy morning fog and too oily condition of the road making this necessary. In one or two cases a plain tread was used on the left front with good success.

MAXIMUM SPEEDS OF BIG CARS OVER MILE STRETCH AS TIMED BY THE TREGO AUTOMATIC DEVICE

No.	Car	Driver		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Clement	Rigal	Mi. Per Hour			88.6					89.5	90.			90.4			85.7	87.7
			Time			:40⅝					:40⅛	:40			:39⅝			:42	:41
2	Lozier	Mulford	Mi. Per Hour			69.2			78.6		80.7	80.7	77.5						
			Time			:52			:45⅛		:44⅜	:44⅜	:46⅜						
3	Simplex	Seymour	Mi. Per Hour		78.	79.		80.7		82.9	80.	81.8	69.4	82.9	82.5	82.5			
			Time		:45⅜	:45⅛		:44⅜		:43⅜	:45	:44	:51⅛	:43⅜	:43⅜	:43⅜			
4	Buick	Burman	Mi. Per Hour																
			Time																
5	Chadwick	Haupt	Mi. Per Hour		78.2														
			Time		:46														
6	Fiat	Nazzaro	Mi. Per Hour		86.9	85.7							85.7	86.5		85.3	84.8	80.	86.9
			Time		:41⅜	:42							:42	:41⅜		:42⅛	:44⅝	:45	:41⅜
7	Acme	Zengle	Mi. Per Hour	67.9	62.5	72.2	88.2	66.											
			Time	:53	:51⅝	:49⅝	:40⅜	:55											
8	Benz	Hemery	Mi. Per Hour	87.7	82.5	94.2					87.7	90.9	93.2	87.7	83.7	90.4	91.8		93.2
			Time	:41	:43⅜	:38⅛					:41	:39⅜	:38⅛	:41	:43	:39⅞	:39⅛		:38⅜
9	DeDietrich	Duray	Mi. Per Hour			87.3			87.7	86.9	87.7		66.	87.3	85.7	82.9	84.9		
			Time			:41⅛			:41	:41⅜	:41		:55	:41⅛	:42	:43⅜	:42⅜		
10	Renault	Szisz	Mi. Per Hour	94.7		98.3	89.2												
			Time	:38		:36⅝	:36⅜												
11	National	Harding	Mi. Per Hour		69.4				62.5	56.2	72.	72.	74.						
			Time		:51⅛				:51⅜	:64	:50	:50	:48⅜						
12	Itala	Cagno	Mi. Per Hour		85.7	91.8													
			Time		:42	:39⅛													
13	Clement	Hautvast	Mi. Per Hour	90.9			87.7			87.3	89.5		93.2	89.5		78.9			89.5
			Time	:39⅝			:41			:41⅛	:40⅛		:38⅜	:40⅛		:45⅝			:40⅛
14	Fiat	Wagner	Mi. Per Hour				75.2	86.9			87.7	84.5	87.7	87.3	72.5	86.9		84.5	90.
			Time				:44⅛	:41⅜			:41	:42⅛	:41	:41⅛	:49⅜	:41⅜		:42⅝	:40
15	Benz	Hanriot	Mi. Per Hour		93.7	100.	92.7	94.2		92.7		90.	88.2	86.1	84.5	85.3	81.1	80.	75.2
			Time		:38⅜	:36	:38⅛	:38⅛		:38⅛		:40	:40⅛	:41⅛	:42⅜	:42⅛	:44⅜	:45	:47⅝
16	Renault	Strang	Mi. Per Hour	95.2	71.1	85.7	100.			99.2	83.7	101.1		101.1	101.7	95.2	98.3		81.1
			Time	:37⅞	:50⅝	:42	:36			:36⅜	:43	:35⅝		:35⅝	:35⅛	:37⅞	:36		:44⅜
17	Itala	Fournier	Mi. Per Hour		82.5	86.1					91.8	86.9	86.1	78.6	79.2		75.2	78.2	80.
			Time		:43⅝	:44⅛					:39⅛	:41⅜	:41⅛	:45⅛	:45⅜		:44⅜	:46	:45
18	Fiat	DePalma	Mi. Per Hour	90.9						89.1	88.6	90.9	90.	90.			89.5	94.7	86.9
			Time	:39⅝						:40⅜	:42⅝	:39⅝	:40	:40			:40⅛	:39	:41⅜
19	Benz	Erle	Mi. Per Hour		94.7	90.	92.7	88.2		83.7		88.2							
			Time		:38	:40	:38⅛	:40⅜		:43		:40⅛							
20	Itala	Piacenza	Mi. Per Hour		86.2	90.9	91.8												
			Time		:40⅝	:39⅝	:39⅛												

ELAPSED TIME, POSITION AND TIME OF EACH LAP IN AMERICAN GRAND PRIX AT SAVANNAH

No.	Car and H. P.	Driver		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Av. Mi. pr. hr.
14	Fiat 115	Wagner..	Elapsed Time	22.30	45.03	69.46	92.14	114.14	138.50	163.07	184.57	208.47	230.58	253.03	279.31	304.16	326.28	348.39	370.31	65.11
			Position.....	2	2	6	4	2	4	4	1	3	2	1	2	3	3	3	1	
			Time of Lap.	22.30	22.33	24.43	22.28	22.00	24.36	24.17	21.50	23.50	22.11	22.05	26.28	24.45	22.12	22.11	21.53	
8	Benz.....110	Hemery..	Elapsed Time	23.54	48.24	70.27	92.39	115.02	137.26	160.20	185.27	207.59	230.49	254.03	279.58	303.11	325.59	348.37	371.27	64.9
			Position.....	8	12	7	6	5	2	2	2	1	1	2	3	2	2	2	2	
			Time of Lap.	23.54	24.30	22.03	22.12	22.23	22.24	22.54	25.07	22.32	22.50	23.14	25.55	23.13	22.48	22.38	22.50	
6	Fiat 115	Nazzaro..	Elapsed Time	23.42	46.45	69.30	92.01	114.44	137.40	160.46	185.37	208.38	231.32	254.22	277.14	299.52	323.32	346.45	379.47	63.6
			Position.....	6	7	5	3	3	3	3	3	2	3	3	1	1	1	1	3	
			Time of Lap.	23.42	23.03	22.45	22.31	22.43	22.56	23.06	24.51	23.01	22.54	22.50	22.52	22.38	23.40	23.13	32.02	
15	Benz.....110	Hanriot..	Elapsed Time	22.38	45.13	67.26	89.44	114.10	136.02	158.38	189.57	219.27	241.47	265.09	288.53	312.44	336.39	360.43	386.12	62.3
			Position.....	3	3	1	1	1	1	1	5	6	5	4	4	4	4	4	4	
			Time of Lap.	22.38	22.38	22.13	22.18	24.26	21.52	22.36	31.19	29.30	22.20	23.22	23.44	23.51	23.55	24.04	25.25	
13	Clement-Bayard 120	Hautvast	Elapsed Time	24.36	48.41	73.06	99.17	123.24	147.31	171.23	195.19	221.11	244.10	268.49	293.00	318.08	343.30	369.13	394.06	61.2
			Position.....	13	13	11	11	9	9	8	7	7	6	5	5	5	5	5	5	
			Time of Lap.	24.36	24.05	24.25	26.11	24.07	24.07	23.52	23.56	25.54	22.59	24.39	24.11	25.08	25.22	25.43	24.53	
16	Renault 115	Strang ...	Elapsed Time	25.13	47.33	70.29	96.23	119.10	141.55	165.30	204.52	227.32	258.18	282.03	306.08	330.03	356.47	378.58	403.37	59.7
			Position.....	15	9	8	8	7	7	6	10	9	9	8	8	8	8	6	6	
			Time of Lap.	25.13	22.20	22.56	25.54	22.47	22.45	23.35	39.22	22.40	30.46	23.45	24.05	23.55	26.44	22.11	24.39	
1	Clement-Bayard 120	Rigal	Elapsed Time	32.23	57.00	81.52	106.46	130.51	154.48	178.31	202.52	230.16	254.45	280.52	304.16	329.11	354.13	380.16	405.49	59.3
			Position.....	19	17	15	14	12	11	10	9	10	8	7	7	6	6	7	7	
			Time of Lap.	32.23	24.37	24.52	24.54	24.05	23.57	23.43	24.21	27.24	24.29	26.07	23.24	24.55	25.02	26.03	25.33	
17	Itala.....120	Fournier.	Elapsed Time	24.30	48.45	73.40	98.37	123.41	148.39	173.21	197.38	225.23	252.53	277.59	303.57	329.51	355.23	381.20	406.32	59.3
			Position.....	12	14	12	10	10	10	9	8	8	7	6	6	7	7	8	8	
			Time of Lap.	24.30	24.15	24.55	24.57	25.04	24.58	24.42	24.17	27.45	27.30	25.06	25.58	25.54	25.32	25.57	25.12	
18	Fiat 115	De Palma	Elapsed Time	22.18	43.54	91.48	113.36	140.14	169.33	191.09	213.04	243.54	266.31	289.05	315.28	338.35	363.43	388.59	411.34	58.6
			Position.....	1	1	16	16	15	13	11	11	11	11	9	9	9	9	9	9	
			Time of Lap.	22.18	21.36	47.54	21.48	26.38	29.19	21.36	21.55	30.50	22.34	22.34	26.23	23.07	25.08	25.16	22.35	
9	De Dietrich 123	Duray	Elapsed Time	24.05	47.48	75.07	105.38	134.07	179.55	203.07	226.22	249.29	294.16	322.41	353.49	379.47	405.33	Running when race was called		
			Position.....	9	10	14	13	13	14	13	12	12	12	10	10	10	10			
			Time of Lap.	24.05	23.43	27.19	30.31	28.29	45.48	23.12	23.15	23.07	44.47	28.25	31.08	25.58	25.46			
3	Simplex 50	Seymour.	Elapsed Time	24.25	48.23	72.06	108.59	139.26	169.06	193.56	251.50	278.14	317.14	343.43	376.26	401.02	426.55	Running when race was called		
			Position.....	11	11	9	15	14	12	12	13	13	13	11	11	11	11			
			Time of Lap.	24.25	23.58	23.43	36.53	30.27	29.40	24.50	57.54	26.24	39.00	26.29	32.43	25.36	25.13			
11	National 60	Harding..	Elapsed Time	55.01	80.46	107.25	136.40	163.28	198.21	225.32	252.34	279.23	318.10	346.49	Carbureter trouble					
			Position.....	20	20	18	18	16	15	14	14	14	14	12						
			Time of Lap.	55.01	25.45	26.39	29.15	26.48	34.53	27.11	27.02	26.49	38.47	28.39						
19	Benz.....110	Erle	Elapsed Time	23.12	45.40	68.12	90.28	115.12	140.36	164.00	186.11	210.07	232.33	Wrecked on White Bluff Road						
			Position.....	5	5	3	2	6	5	5	4	4	4							
			Time of Lap.	23.12	22.18	22.32	22.16	22.44	25.24	23.24	22.11	23.56	22.26							
12	Itala 120	Cagno	Elapsed Time	24.11	46.40	69.27	95.21	121.08	144.20	167.27	190.49	217.11	260.03	Broke rear spring						
			Position.....	10	6	4	7	8	8	7	6	5	10							
			Time of Lap.	24.11	22.29	22.47	25.54	25.47	23.12	23.07	23.22	26.22	42.52							
2	Lozier 45	Mulford..	Elapsed Time	25.11	63.07	101.03	128.45	171.52	310.23	337.43	366.53	394.02	429.11	Still running when race was called						
			Position.....	15	19	17	17	17	17	15	15	15	15							
			Time of Lap.	25.11	37.56	37.56	27.42	43.07	38.31	27.20	29.10	27.09	35.09							
10	Renault 115	Szisz.....	Elapsed Time	22.41	45.16	67.33	92.24	114.46	141.12	Car broke bearing on Ferguson avenue										
			Position.....	4	4	2	5	4	6											
			Time of Lap.	22.41	22.35	22.17	24.51	22.22	26.26											
7	Acme 60	Zengle....	Elapsed Time	27.22	54.04	181.31	208.53	236.45	263.52	Broke right front spring										
			Position.....	17	16	19	19	18	16											
			Time of Lap.	27.22	26.42	127.27	27.22	27.52	27.07											
20	Itala 120	Piacenza.	Elapsed Time	24.41	51.31	74.48	98.07	125.48	Left course at Isle of Hope											
			Position.....	14	15	13	9	11												
			Time of Lap.	24.41	26.50	23.17	23.19	27.41												
5	Chadwick..... 60	Haupt....	Elapsed Time	23.51	47.17	72.23	99.52	Trouble with lubrication and hand pumps												
			Position.....	7	8	10	12													
			Time of Lap.	23.51	23.26	25.06	27.29													
4	Buick..... 40	Burman..	Elapsed Time	31.44	59.56	Car ran off course near County Farm														
			Position.....	18	18															
			Time of Lap.	31.44	28.12															



TREGO AUTOMATIC TIMER WITH TWO STOP WATCHES

FASTEST LAPS IN RACE

Driver	Lap	Time	M.P.H.
De Palma	2	21:36	69.7
De Palma	7	21:36	69.7
De Palma	4	21:48	69.1
Wagner	8	21:50	69
Hanriot	6	21:52	68.9
Hautvast	16	21:53	68.9
Hemery	3	22:03	68.3
Wagner	11	22:05	68.2
Wagner	10	22:11	67.9
Wagner	14	22:12	67.9
Wagner	15	22:11	67.9
Strang	15	22:11	67.9
De Palma	1	22:18	67.6
Szisz	5	22:22	67.3
Hemery	9	22:32	66.9
Nazzaro	13	22:38	66.7
Nazzaro	12	22:52	66.5

LAP BY LAP WITH THE GRAND PRIX RACERS

SEYMOUR TEARING AROUND A BANKED TURN

SAVANNAH, GA., Nov. 26—Fog again threatened a long postponement of the American grand prize just as it had the day before in the light car race. As it was, when the cars were lined up at 8:30 o'clock the mist so thickly clouded the course that one could not see 100 yards up the road. At the appointed starting hour of 9 o'clock conditions were just as bad. Half an hour later there was some improvement, but then prudence forbade sending the drivers away into the mist clouds. A quarter of an hour later Starter Wagner gave Rigal the word. By the time the field of twenty was under way, however, the sun had triumphed and a bright balmy day was at hand.

The Start—All of the twenty entrants faced the starter, who sent them away at minute intervals in the following order: Rigal, Clement; Mulford, Lozier; Seymour, Simplex; Burman, Buick; Haupt, Chadwick; Nazzaro, Fiat; Zengle, Acme; Hemery, Benz; Duray, de Dietrich; Szisz, Renault; Harding, National; Cagno, Itala; Hautvast, Clement; Wagner, Fiat; Hanriot, Benz; Strang, Renault; Fournier, Itala; de Palma, Fiat; Erle, Benz, and Piacenza, Itala. The Americans had the best positions in line, four of them being in the first quintet, the other two starting seventh and eleventh respectively.

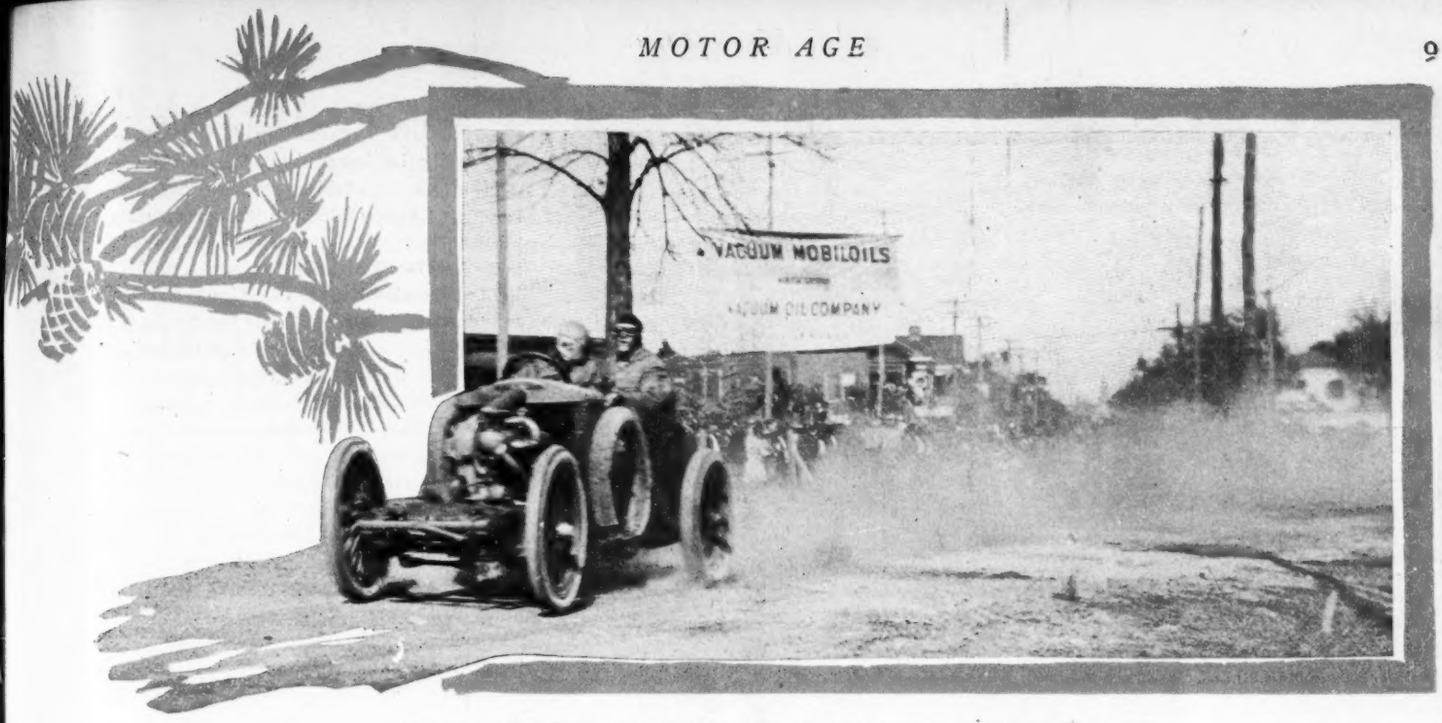
First Lap—With the field under way in 19½ minutes, the spectators had not long to wait for the head of the flying column to reach the grand stand. It was the Lozier, Mulford having gotten by Rigal. Then came Seymour, who also had passed the Clement crack. Haupt outfooted Burman and Hemery easily disposed of Zengle. All this time de Palma, the former bicycle rider, was coming like a whirlwind from the rear with the Fiat. When the racers had passed and the times were matched up de Palma was the leader, 12 seconds ahead of Wagner, who had beaten Hanriot 8 seconds, the Benz driver in turn leading Szisz by 3 seconds. Nazzaro and Hemery, the favorites, were content with conservative laps in 23:42 and 23:54 respectively. Szisz was pushing the Renault hard in 22:41, a 67-mile-an-hour clip, which was fast for the tortuous circuit.

Second Lap—Willie Haupt flashed to the fore in the second lap with the Chadwick and got a royal welcome from the spectators, who were eager to hurrah for an American as long as they had a chance. De Palma continued to climb up the ladder hand over fist. Scoring 21:36, the fastest lap in the race, equaled only by his own in the seventh round and showing a 70-mile-an-hour gait, the Italian-American lad increased his lead over the field. He led Hanriot, who had been going some also, by 1 minute 19 seconds, a good mile and a half of margin. Wagner, Erle, Cagno and Szisz also were hitting the pace. Nazzaro and Hemery were driving well within themselves at 65½ and 61½ miles an hour averages. It was a magnificent struggle for the lead of the seven leaders traveling at faster than 63 miles an hour.

Third Lap—Before the third round closed the three Americans, Mulford, Seymour and Haupt, had lost their leadership of the procession and Nazzaro was making the pace. De Palma suffered a 5-minute delay and dropped back from the leadership into the ruck. Henriot and Szisz had fought their way to the front and were having a neck-and-neck struggle for the premiership, the Benz leading the Renault by but 7 seconds, with Erle in hot pursuit ½ a mile further back. One of the Americans, Burman, was out of the race for good. Nazzaro, Hemery and Wagner, the ultimate trio of leaders, were back in the second division, which included Cagno and Strang.

HARDING'S NATIONAL TRAVELING AT TOP SPEED

Fourth Lap—The fourth round saw Nazzaro, Hemery and Szisz leading the procession. They were only leaders, however,



STRANG IN HIS RENAULT DOING 101.7 MILES PER HOUR ON THE HOMESTRETCH

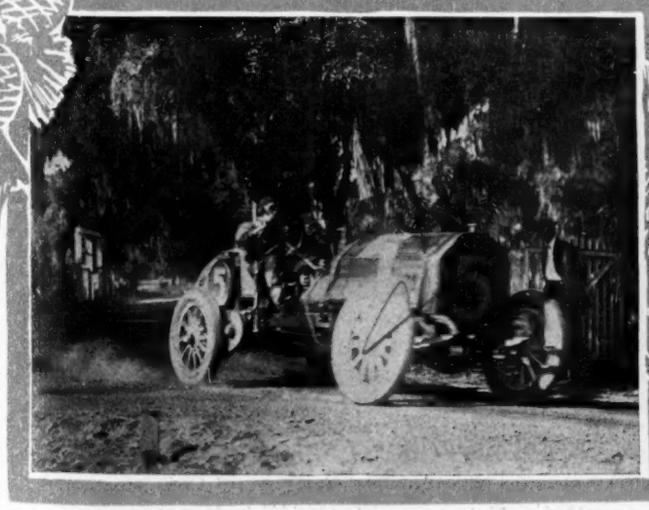
so far as the order of passing the stand went, for Hanriot still held the lead, in time the Benz having covered 100.52 miles in 89:44. Another Benz man, Fritz Erle, was in second place, only 44 seconds behind his team mate. The German pair had opened close to a 2-minute gap on Nazzaro, who was being hotly pursued by Hemery, ½ a minute further to the rear. Haupt was making the best showing of the Americans, the Chadwick being still in the middle of the European bunch with as many behind him as ahead of him.

Fifth Lap—Hanriot still hung stubbornly to his lead, by a round in 24:26, a 61.5-mile gait. Wagner had dislodged Erle from second place. It was now becoming a race that for closeness will live in motor history. The leaders were only seconds apart, their order and times being: Hanriot, 114:10; Wagner, 114:14; Nazzaro, 114:44; Szisz, 114:46; Hemery, 115:02; Erle, 115:12, for 125.65 miles.

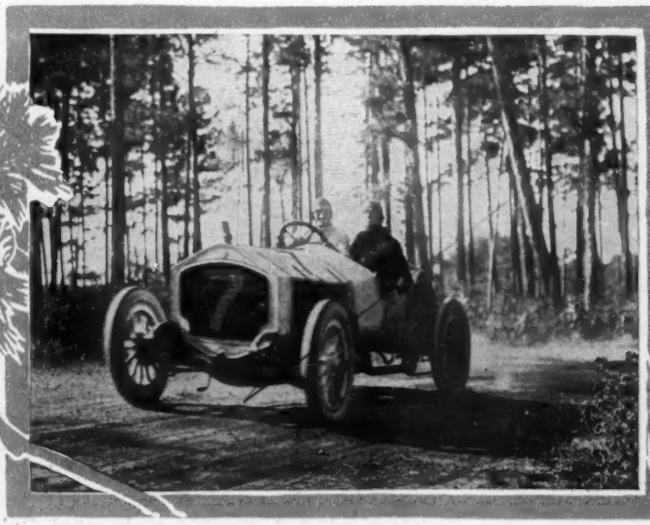
Sixth Lap—Nazzaro and Hemery were now driving their cars for all they were worth in an effort to overtake the flying Hanriot. They managed to outpace Szisz, Warner and Erle, but Hanriot for the time being was too much for them, for the Benz showed a round in 21:52, which landed it 34 seconds ahead of Hemery and 1 minute 8 seconds to the better of Nazzaro. Wagner was their pursuer.

Seventh Lap—Hanriot slowed down a bit in this round, but not enough, however, to cost him his lead. Nazzaro and Hemery were having a fine duel between themselves, the Frenchman leading the Italian by but 14 seconds. Both were hot-foot after the runaway Benz. Wagner was hanging fire a bit, but de Palma had got his Fiat going again and was after the leaders in earnest with a lap in 21:36, which tied his record of the second lap. All this time the fat and prosperous veteran Fournier was not making a half bad showing with the Itala, plugging along pretty steadily at a 60-mile-an-hour gait. Seymour was driving the best of the Americans, Haupt having thrown up the sponge for good during the fifth round because of lubrication troubles.

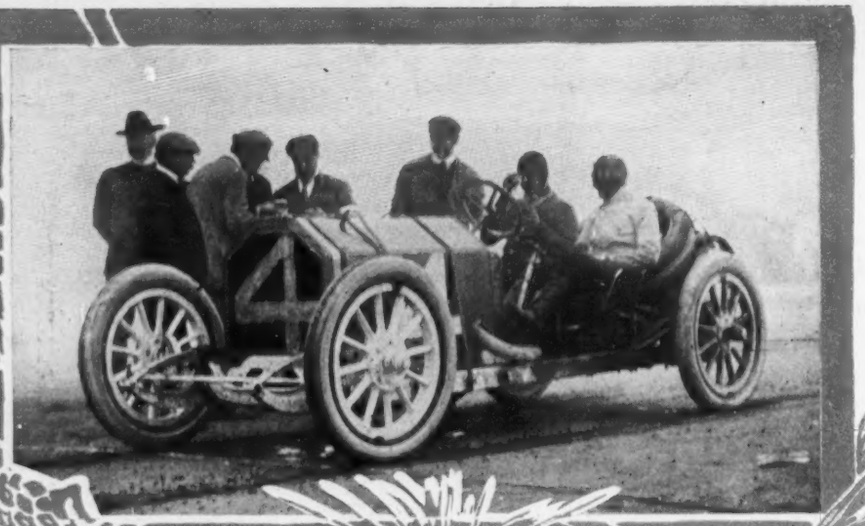
Eighth Lap—Before the half-way post had been passed, Wagner, Hemery and Nazzaro, the ultimate leaders in the race, had fought their way into the three leading positions. At the end of the round, in fact, they occupied the positions named, which were the order of their final finish. Wagner led Hemery 30 seconds, who had a margin of but 10 seconds over Nazzaro. The Fiat crack, following his invariable custom, stopped at the half-way post to replenish fuel. So did the Benz champion. Wagner, however, continued. Hanriot had halted by the wayside, and now was in fifth position, Hautvast having passed him. The other racers were now hardly in the running, so



HAUPT'S CHADWICK ON A TURN



ZENGLE'S ACME AT TOP SPEED



BURMAN'S BUICK WITH ITS UNDERSLUNG FRAME

far as hopes of the first three places went. In the preceding round, by the way, Szisz had dropped out, having broken a bearing in the front axle of his Renault.

Ninth Lap—The race now had practically narrowed down to a triangular duel among Wagner, Hemery and Nazzaro. Wagner lost his narrow lead this round by making his delayed stop for gasoline and oil. Entering the last half of the race, Hemery began to drive like a speed fiend possessed. Covering this lap in 22:32 he completed it with 39 seconds of precious margin to his credit. Wagner having fallen over a minute to the rear of Nazzaro; Hautvast, Hanriot, de Palma and Erle were also spurting hard, but they were too far behind for their sprinting to be of much avail.

Tenth Lap—The three-cornered fight for the lead kept the spectators "on their toes" all the time. They watched eagerly for the coming of the first of the trio and listened attentively for the figures as they were announced. Wagner got by Nazzaro, but still was 9 seconds behind Hemery.

Eleventh Lap—In the preceding lap Wagner had made the 25:13-mile circuit in 22:11. He lowered this to 22:05 in this round, and by his sprint secured a lead of a minute over Hemery and 1 minute 19 seconds over Nazzaro. Cagno was put out of the race in this lap by a broken rear spring.

Twelfth Lap—It was now up to Nazzaro to be up and doing something. He did it. A lap in 22:52, aided by a faltering of Wagner and Hemery, gave him the lead, and a pretty good lead, too, considering how near the finish was. In fact, the score board was completely upset, Nazzaro leading Wagner 2 minutes 39 seconds and Hemery by 2 minutes 44 seconds. It looked to be all over but the shouting for Nazzaro.

Thirteenth Lap—Increasing his pace to a 23:38 lap, Nazzaro pulled still further away from Hemery. Wagner had slowed down to 24:45 and wound up the round 1 minute 5 seconds behind Hemery, who was 3 minutes 39 seconds behind Nazzaro. It looked to be more than ever a cinch for the Italian.

Fourteenth Lap—Hemery spurted gamely in this round, scoring 22:48 for the circuit and cutting down Nazzaro's lead to 2 minutes 27 seconds. Wagner went even faster and at the finish of the lap had reduced the Benz's lead to 29 seconds by a round in 22:12, his fastest circuit so far.

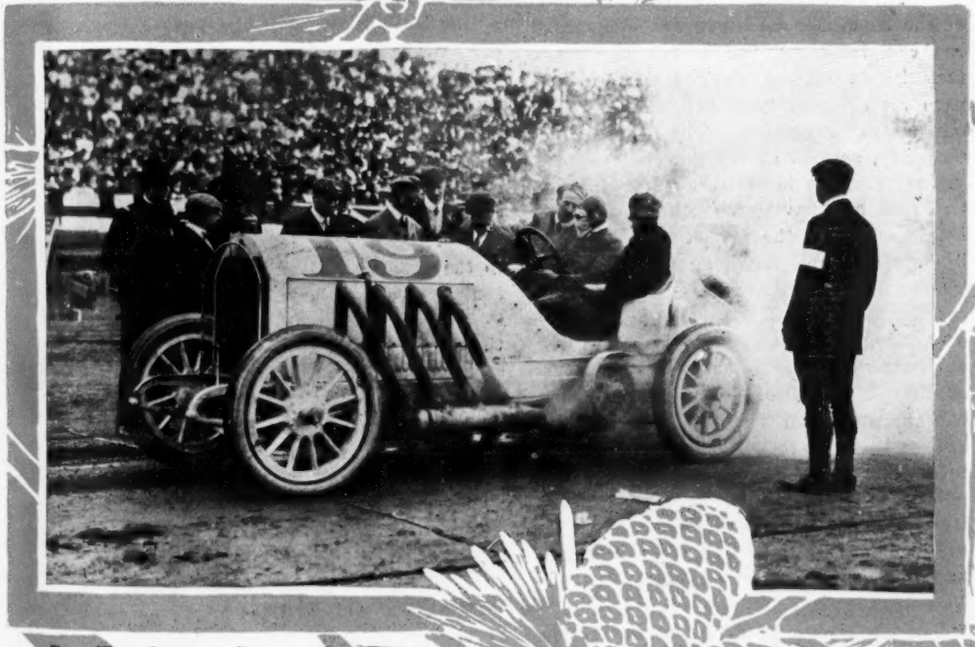
Fifteenth Lap—Nazzaro having the race well in hand slowed down a wee little bit. Wagner quickened his pace to 22:11, his fastest in the race, and Hemery raised his gait to 22:38. The two French pilots were making a magnificent effort to overtake the cool-headed Italian. To what a high pitch of excitement the closeness of the struggle had wrought up the spectators can easily be imagined. All hands were on their feet watching up the stretch for the appearance of the leader and straining their ears to catch promptly the figures the timers gave out.

The Finish—Nazzaro entered the final round with a lead of 1 minute 52 seconds over Hemery, whose margin over Wagner was but 2 seconds. Barring one of those hundred accidents that can befall a motor car racer, Nazzaro was the winner. Within 2 minutes after Hemery and Wagner had passed the stand, the megaphone man fired a bombshell into the crowd. "Hemery has passed Nazzaro." A telephone man had sent the message, but gave no particulars. The crowd refused to believe its truth, until the white Benz was seen coming down the stretch. Nazzaro was indeed beaten, but Wagner had not started until 6 minutes after Hemery, and the race was not over. Then came Nazzaro, the first of the trio to start. Then came at last, after what seemed hours of suspense to the waiting crowd, Wagner. There was a death-like silence and then someone in the Fiat pit cheered. Then came the megaphoned time. Wagner had won. He had beaten Hemery by 56 seconds and Nazzaro by 2 minutes 27 seconds. A puncture, in fact, two of them, had been the Italian's undoing. A tire was quickly replaced, but Nazzaro had gone but a short distance when he discovered that the tire he had just put on was soft and another change was necessary. The finish of Hanriot, who was fourth, was ludicrous. His Benz had run short of gasoline at the head of the home stretch, and it literally coasted in. Its crew swayed their bodies and the crowd "rooted" to help it along. It just managed to get across the tape.

PIACENZA IN ITALA TRAVELING AT 95 MILES AN HOUR

Sidelights on Big Racing Cars

WITH the exception of the Renault, all of the foreign cars used motors with valves in the head, and having hemispherical combustion chambers. This method of construction is orthodox for racing cars for Europe this year and undoubtedly will be the only design used next year. The international rules allowed of a diameter of 6.1 for four-cylinder cars, and practically all of them lived up to this limit. The stroke in many of the cars is still a mystery, the drivers and superintendents of the training quarters objecting to any attempt to measure them. It is known, however, on good authority, that the Benz cars used an 8-inch stroke, which is longer than any of the others. The Clements make use of a 7½-inch stroke. Using long strokes and having the valves in the head gives an extra high engine, but this is practically counteracted by carrying it lower in the frame. In the Fiats, the cylinders of which are cast in pairs—they are cast in pairs in all of the foreign cars represented—the valves are placed side by side in the cylinder heads and all made 3¾ inches in diameter. A particularly long rocker arm is used for the exhausts and shorter ones for the intakes, both being operated from one camshaft, which also carries the cams for working the make-and-break igniters. The intake manifold is of enormous size and the carbureter placed high up and close to the cylinder-heads.



Rele Who Came to Grief in Lap Eleven

Valves on the Italas

In the Itala cars the valves, properly speaking, are not in the cylinder heads, but in small valve chambers at one side, the intake being in the top of the chamber and the exhaust in the bottom. In the center of the cylinder head is the make-and-break device. Particular care has been taken to thoroughly lubricate the valve rocker arms as well as the make-and-break parts, which is done by an oil pipe passing over the cylinder head and having two leads to each make-and-break and three to each rocker arm, the oil being fed by pressure to these parts. The Itala makers, like all of the others, have learned the fact that with high speed an over-abundance of oil is necessary.

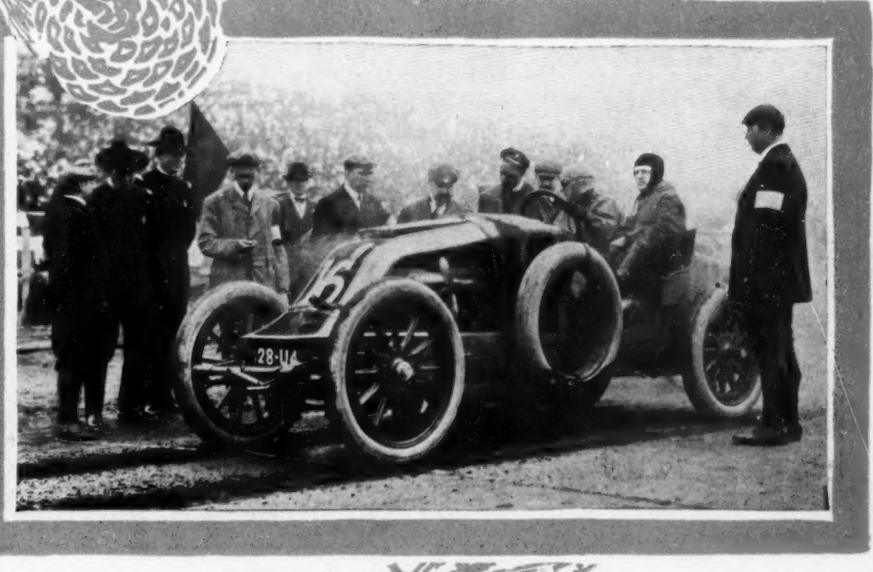
In the Clement-Bayard engines the camshaft is carried over the heads of the cylinders, being driven by a vertical shaft between the front cylinder and the radiator, with bevel gears. In this shaft is a universal joint which drives a cross shaft, to one end of which the magneto is attached with the water pump at the other. The cylinders in these cars are steel castings. Both of the Renaults use cylinders in pairs, with opposite valves, and employ thermo-syphon water circulation, with water pipes of larger diameter than an exhaust manifold. The radiator is a vertical tube U-shaped one, embracing the rear cylinder casting partly within the recess. The motor has a transverse shaft in front, on which the magneto is at one end and the high-tension distributer at the other.

The Benz motors are conventional valve in the head types with valves operated through rocker arms. On practically all of the foreign cars the Bosch magneto was used, the Fiats and Italas being the only ones to use the make-and-break spark.

American Motors T-Headed

All of the American cars used motors of the T-head variety, having intake valves at one side and exhausts opposite, with a crankcase containing camshafts for working the valves. Of the six Americans, three, namely, Acme, National and Chadwick, were six-cylinder machines, the Acme and National using separately cast cylinders, and the Chadwick twin castings surrounded by copper waterjackets. The Simplex, Lozier and Buick used four-cylinder types, cast in pairs. The Remy magneto was used on the Buick, the Eisemann on the Acme, and Bosch on all of the others.

The race was an even break in the chain and shaft drive field, ten cars having chain-drive, and ten shaft. The first four places went to chain drive, the second four to shaft. Three of the American cars were shaft-driven, three chain-driven. The necessity for using shock absorbers was apparent, and four were regularly fitted to all of the cars excepting the Buick. On American machines Hartfords were used entirely, and the majority of foreign cars employed types manufactured in their home factories.



Szisz at Start Wearing Face Mask

KEEPING CARS UP TO CONCERT PITCH

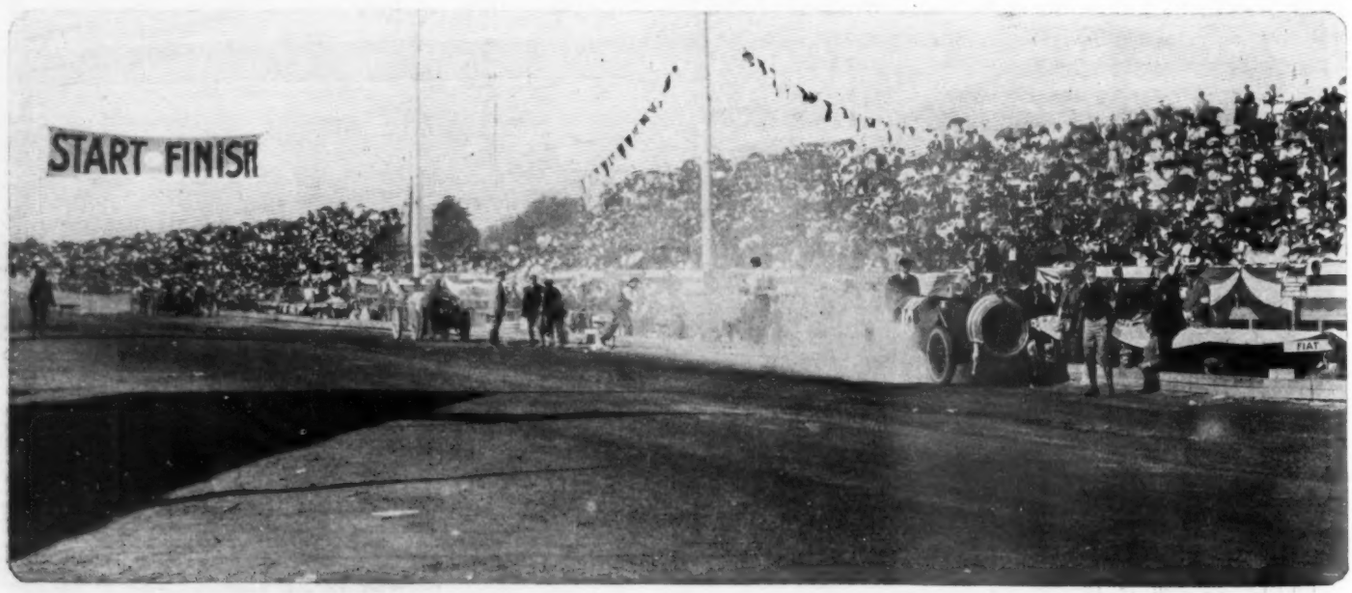
WHAT could show more conclusively the excellent workmanship in many of the high-grade racing cars in the long grind than the fact that out of the twenty that started in the 402-mile grand prize event nine actually finished the race and three others were running in good shape when the referee declared the contest off, making twelve out of twenty, or 60 per cent, in commission after the gruelling experiences over the rough roads for almost 7 hours. Of the eight that dropped out one was due solely to an accident, namely, No. 9 Benz, driven by Fritz Erle, which was overturned on the White Bluff road by the tire tread on the right rear wheel coming loose and striking Erle, who was knocked unconscious. The mechanic was left to control the car. This left but seven cars actually put out of the running because of troubles with the machines or the drivers. Two of these went out through broken springs, one through oiling troubles, one because of a broken camshaft, one a broken ball-bearing and two others because of troubles caused through running off the road during the race.

Superiority of Foreigners

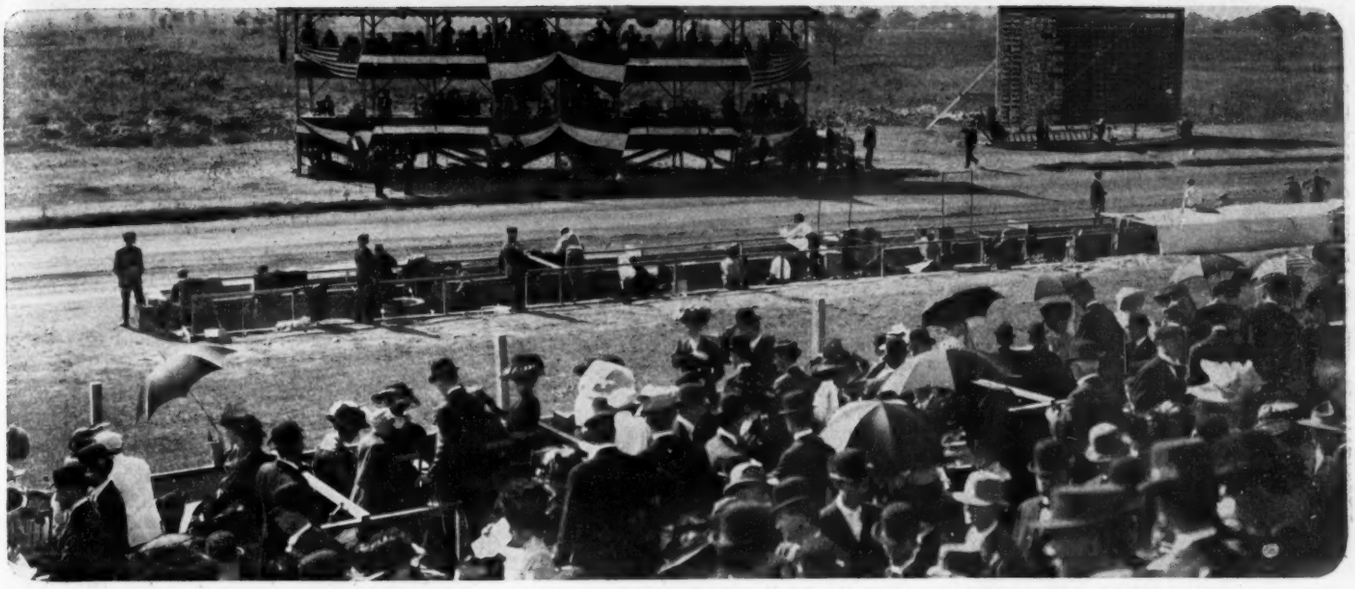
That the foreign cars were the superiors of the American machines was evident at the completion of the second lap when they began pulling away and setting a pace all of their own and moving with the utmost regularity. The motors ran perfectly, several of the drivers not having to raise the hoods throughout the entire race and having no other task than holding them on the road, taking on gasoline and oil and repairing tires. In the sixteen laps made by each of the nine foreigners to finish not a single instance of running on three cylinders occurred and only one case of a motor in the symptoms of distress appeared. The cars were built for the task and trained to it. Before any of them contested in their first races this year they were given thousands of miles of touring work through Europe, when the drivers had a chance to learn every detail of them and when the cars had an excellent opportunity to get worn in.

The troubles with the American cars in most cases were due to lack of preparedness. Either the cylinders were not properly worn in, the lubricating means had not been sufficiently tried out or other parts duly tested. In connection with the American machines it must be remembered that three were stock machines with a few racing necessities added and the others semi-racing cars which were but natural evolutions of stock machines and not out-and-out racing locomotives built expressly for the big road races of 1908. It is unusual in road races for cars to be eliminated because of broken springs, which, however, was due to the rough condition of parts of the course and some of the bad trolley crossings, two of which the cars had to cross.

Wagner with the winning Fiat had few other troubles than tires and stops for gasoline and oil. His motor sounded the best of the three Fiats, although he did not make as fast time as did de Palma with No. 18 Fiat. Wagner's motor had a very regular purr which was rhythmic to the extreme and an examination of the complete car at the end of the run failed to disclose any evidence of trouble to the running gear. In the twelfth lap when stopping at the grand stand pits to take on oil and a new tire the mechanic examined the jackshaft at the left end and used a bit of rope in tying up apparently some small part of the chassis which evidently had nothing to do with the jackshaft. This was the only evidence of trouble the car had during the entire race. Hemery's No. 8 Benz did not even give that much trouble and the only stop made at the grand stand was in lap eight to



THREE CARS MAKING REPAIRS AT THE GRAND STAND PITS AT ONE TIME



A General View of the Repair Pits Showing How Orderly Everything Was

take on gasoline and oil. Nazzaro had an equally clear record, his car running perfectly throughout the contest, tires only being the troublesome factors. Hanriot with No. 15 Benz in the first seven laps looked a certain winner and was leading in time for several successive laps. The Trego timer reported him making the mile straightaway at a speed of 100 miles per hour. But the pace broke the oil lead from the hand pump to the crankcase and a delay of 9 minutes in the eighth lap and 7 minutes in the ninth frosted the fondest hopes of his admirers. Having to change two tires in one lap at this time was the expected result of the terrific pace he had set and still further separated him from the premier position. He further lost 2 minutes 31 seconds in the eighth lap when taking on gasoline and oil. He ran out of gasoline at the end of the last lap and his car was barely able to coast over the finishing line, which made his last lap about 3 minutes slower than his average. The speed table shows that in six of the first nine laps when his time was taken over the measured mile he was traveling at over 90 miles per hour and it was further noted that he never slowed down when crossing the trolley track on the home stretch 1 mile from the finishing line at which point his rear wheels were off the ground for 30 feet at a time. It was this mad pace that caused the oiler lead to break and the tires to wear out.

Hautvast Drives Consistently

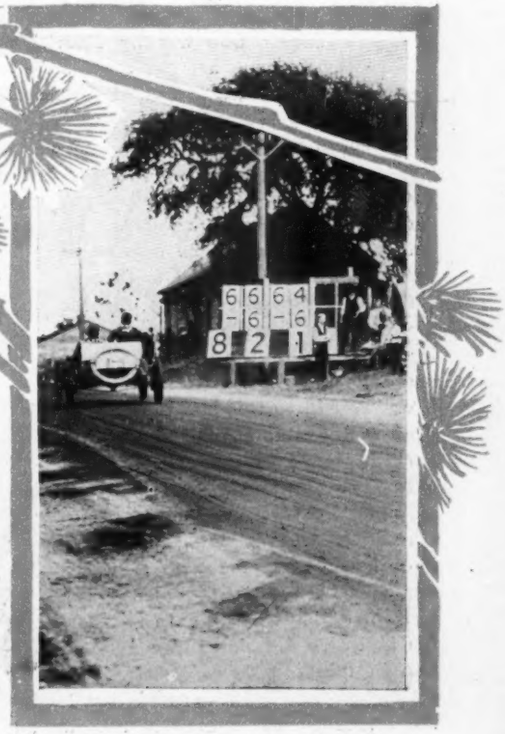
Hautvast in No. 13 Clement drove a remarkably consistent race and had the Clement machine working at its limit most of the time. He made but two stops in front of the grand stand pits, one in the ninth lap, when 2 minutes were consumed in changing a couple of rear tires and in taking on of supplies. Again in the last lap he stopped for 25 seconds. Lewis Strang, the winner of first honors on the same course last March in the stock chassis race, was in hard luck with his Renault, and, although he made the fastest miles on the home stretch, running as high as 101.7 miles per hour, he never averaged high on his laps. He was over 25 minutes on the first lap and came past the grand stand with the bonnet off and completed the race without it. On the third lap he lost 3 minutes at the grand stand pits in changing a left rear tire; at the start of the seventh lap he lost nearly 15 minutes with tires and engine troubles.

Rigal in No. 1 Clement started off with bad luck in the first lap, when he was compelled to put on a second magneto, the first one going out of commission and costing him 7 minutes at the start of the race. On the eighth lap he changed the two rear Dunlop tires and took on gasoline and oil, the three operations being completed in 3 minutes 15 seconds, one man doing the tire changes in the minute. Rigal's car was not so fast as the Fiat or Benz, but its regularity of running was such as to bring forth cheers from the grand stand as soon as it realized what the machine was doing.

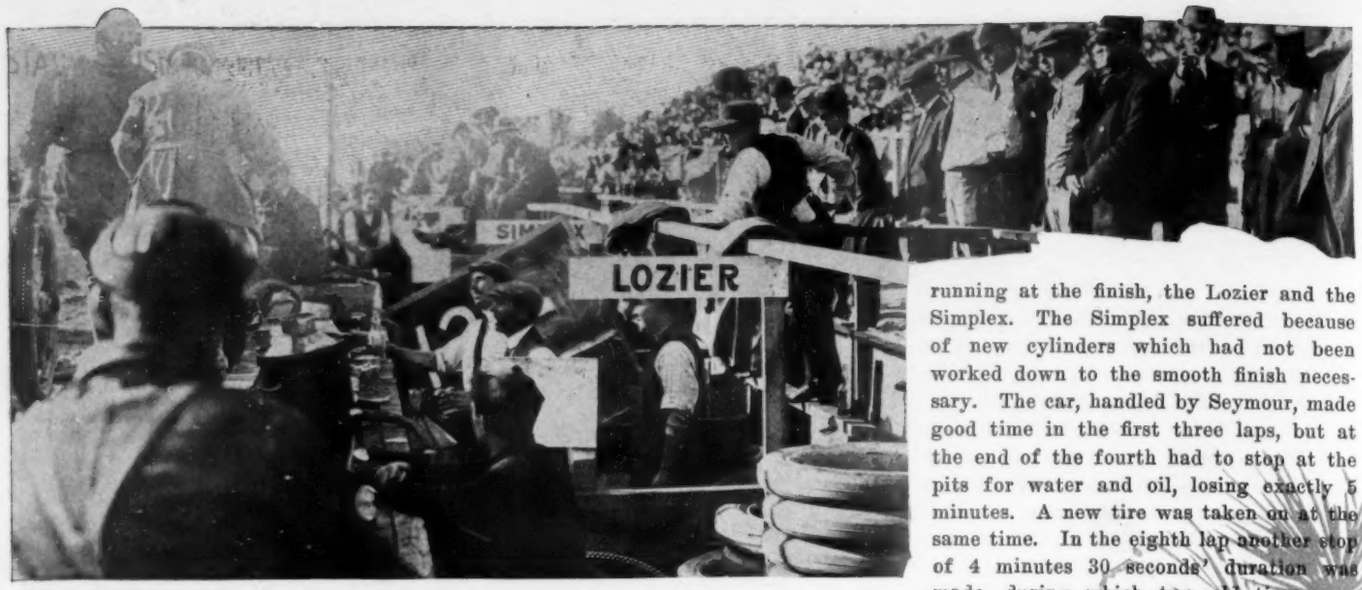
After Rigal in the honor roll came Henry Fournier with his shaft-driven Itala, the only one of the three cars of this make to be running at the end of the race. For the first eight laps he drove consistently, doing all of them in 24 minutes and a few seconds; but after this his pace was slower. Laps nine and ten were slow, due to tire changes and taking on fuel, and the last six laps averaged more than 1 minute slower than the pace he set in the first half of the race. Cagno, driver of No. 12 Itala, withdrew at the end of the tenth lap because of breaking the long leaf in the left rear spring where it turned around the shackle bolt. The four springs on this car were completely taped, as were the shackle links and bolts, and it required the cutting off of this taping before the exact nature of the break could be discovered. When the trouble was detected the car was driven off the course at the end of the pits, where it remained until the completion of the race. Piacenza, driving the third Itala, No. 20, went off the road on the Isle of Hope turn and withdrew from the race and it was impossible to discover the exact nature of the trouble.

Broken Radius Rod Stops Duray

Duray, driving No. 9 de Dietrich, met with misfortune in lap five, when the radius rod on the right side broke, allowing the jackshaft sprocket to pull back toward the rear wheel, after which the driving chain broke and cut Duray severe-



One of the Signalling Systems



THE GRAND STAND PITS WERE BUSY PLACES DURING THE RACE

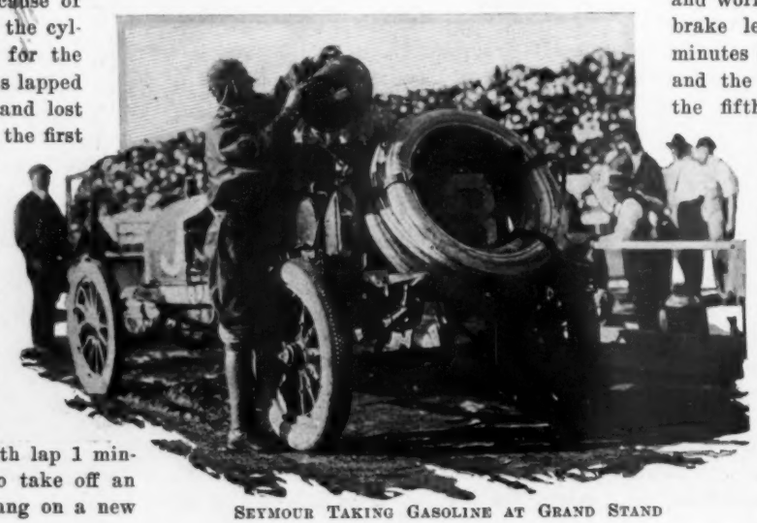
ly on the right arm above the elbow. He drove to the grand stand, where the wound was dressed, after which the broken parts of the car were repaired in 21 minutes 15 seconds, which was enough to put him out of the race. Later in the tenth lap 3 minutes was lost in taking on gasoline and changing a rear tire. Again in the twelfth 1 minute 48 seconds was needed in dressing the injured arm. He had completed fourteen laps when the race was called off.

De Palma in No. 18 Fiat was picked by many as the possible winner of the race and the way he reeled laps off at the start did much to convince others that this confidence was well placed. He did four laps in less than 22 minutes to the lap and there were only three circuits made by two of the other drivers under the 22-minute mark. One was by Hanriot's No. 15 Benz, which set the sixth lap at 21:52, whereas de Palma placed the mark at 21:36 in the second lap, duplicated it in the seventh and made a couple of other laps in 21:48 and 21:55. But the pace worked havoc with his oiling system and tires and in the third lap his car actually froze for a time because of not having fed enough oil to the cylinders. He required 47:54 for the lap, during which time he was lapped by nearly all of the others and lost every hope of getting within the first five. To add to this loss of time was 4 minutes 15 seconds in lap five, when he changed a tire and took on gasoline. In the sixth lap 7 minutes 30 seconds was lost in oiling the motor and overcoming the difficulties caused by lack of lubrication. In the ninth lap 5 minutes was lost in taking on gasoline, oil and water. In the twelfth lap 1 minute 5 seconds was needed to take off an old tire from the car and hang on a new one; in the fourteenth another 2-minute stop was needed for taking on more oil. It may frankly be stated that de Palma's entire troubles were due to the terrific pace he set and not increasing the oil feed in proportion to it. To add to these difficulties he had troubles galore. At the finish of the fifth lap, when changing a right front tire the big jack slipped, letting the rim of the wheel down on the ground, dropping the car axle too low to get the large lever jack under it and making it necessary to use a small screw jack to raise that side of the car enough to get the lever jack in position. Again at the end of the sixth lap he changed the left front and right rear and put a couple of new ones on the back of his car. He then decided to change the left rear and in doing this the first demountable rim with tire he tried was too tight and after kicking for some time to get it on had to roll it back to the pit. The second one was no better and after wasting time he called for a third one, which slipped on easily.

Of the six American cars contesting not one finished the sixteen laps, but two were running at the finish, the Lozier and the Simplex. The Simplex suffered because of new cylinders which had not been worked down to the smooth finish necessary. The car, handled by Seymour, made good time in the first three laps, but at the end of the fourth had to stop at the pits for water and oil, losing exactly 5 minutes. A new tire was taken on at the same time. In the eighth lap another stop of 4 minutes 30 seconds' duration was made, during which two old tires were thrown off the tire rack on the car and three new ones placed on it; this done, gasoline, oil and water were taken on. Again in the tenth lap a 5-minute stop was made at the pits when a new tire was taken on and gasoline, oil and water replenished. None of Seymour's laps was made in less than 23 minutes. The car, barring its motor troubles as already stated, had no mishaps whatever but the frequent stops for tire changes. He was in the fifteenth lap when the race was called off, and was running fast.

The Lozier was the first car to stop in front of the grand stand, halting for 1 minute at the end of the second lap to take on water and put on a new rear tire. On the third lap another stop was made and again in the eighth. The car plainly showed the results of not being ready for the fray. Like the Simplex, had it had 2 or 3 weeks' workout there would be a different story to tell and it would have been well up among those to have finished the sixteen laps.

The six-cylinder Chadwick driven by Haupt, after making the first two laps in a few seconds above the 23-minute mark, stopped at the end of the third circuit and work was done on the emergency brake lever. The third lap was 2 minutes slower than the previous two and the fourth still slower. During the fifth a telephone message announced that the car had quit the race, due to the hand oil pump becoming disabled, which resulted in the reported burning out of one of the motor bearings, presumably a connecting rod one. General regret was expressed on every hand that Haupt should have troubles of the same nature as de Palma, which were not in any sense due to faulty construction, but rather to feeding too small a quantity of



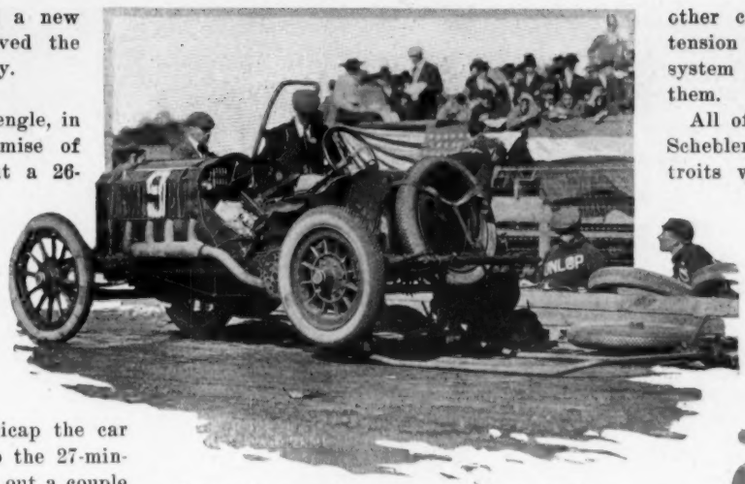
SEYMOUR TAKING GASOLINE AT GRAND STAND

oil. It is reported he used a new hand oil pump which deceived the mechanician as to its capacity.

Spring Trouble On Acme

The Acme six, driven by Zengle, in its first two laps gave promise of finishing the course at about a 26-minute per lap pace,, but in the third circuit broke the right front spring and was over 2 hours making the circuit. When it appeared at the grand stand the frame at that point was supported on a block of wood that was strapped in position. With this handicap the car made four more laps close to the 27-minute mark, but finally dropped out a couple of hours before the finish of the contest, the pace being too fast for a spring suspension of that nature.

Harding, in the six-cylinder National stock car, got into difficulties on the first lap when some waste worked into the gasoline line, requiring over 55 minutes to make the lap and remove the impediment. After this the car had a little carbureter trouble, but was running with regularity. During the eighth, ninth, tenth and eleventh lap it was in a neck-and-neck race with Seymour in the Simplex and caused the grand stand to begin computing on which of them would be the leader in the American car class. In the eighth the Simplex led by less than a minute. In the ninth it had increased this to 69 seconds. In the tenth it dropped to 56 seconds, but by the end of the eleventh it was increased to over 3 minutes. At this point the National stopped in front of the grand stand and pulled off the course.



DURAY CHANGES TIRES AND TAKES ON FUEL

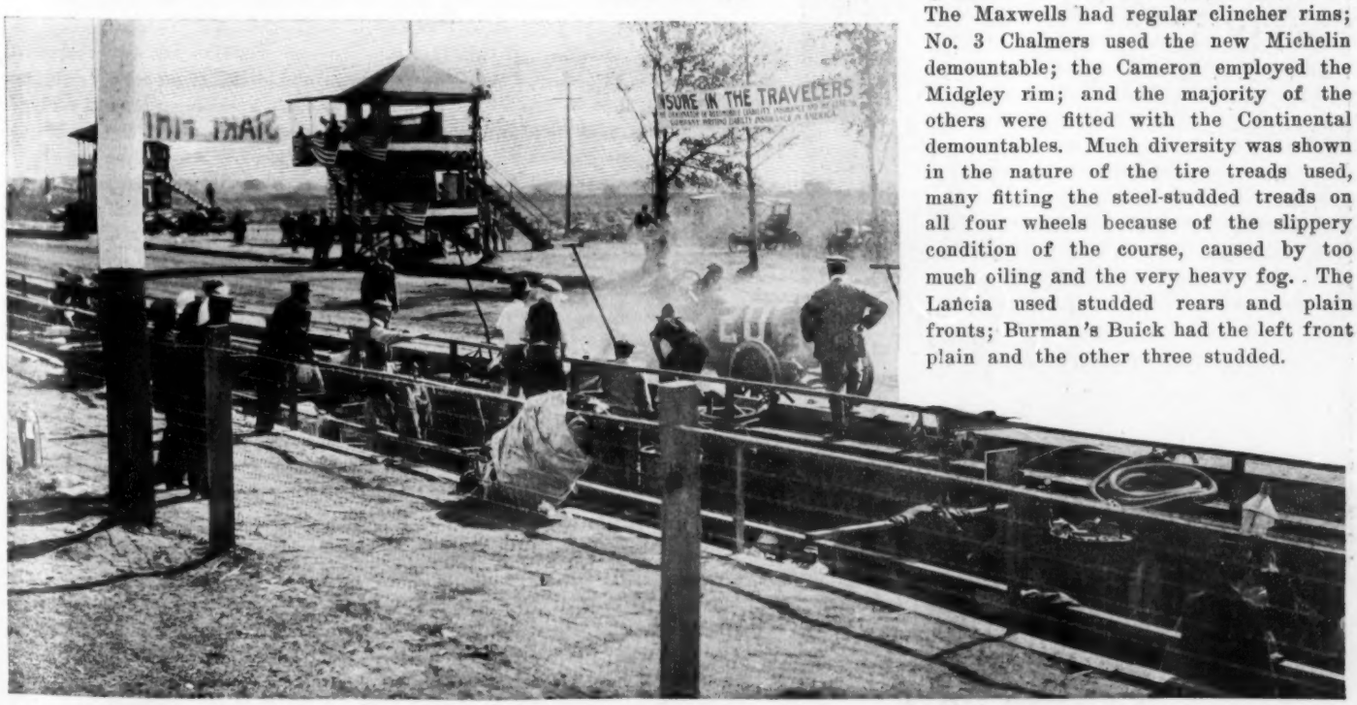
Facts on the Small Cars

OF the four-cylinder machines four—the three Chalmers-Detroits and the Isotta—used cylinders formed in one casting, the Isotta having the intake and exhaust valves in the cylinder heads with one rocker arm for each valve and an overhead camshaft which, with the rocker arms and valve cages, is entirely enclosed by an aluminum cap which forms an oil-tight compartment within which a splash occasioned by the rocker arms is maintained for the cams and rocker arm parts. The Lancia, Buicks and S. P. O. have cylinders cast in pairs, the Buicks with valves in the heads and the other two with valves in the bottoms of chambers on one side of the cylinders. Remy magnetos were on the Cameron and Nos. 8 and 16 Buicks, the two last named having underslung frames. On all of the other contestants were Bosch high-tension magnetos with a spare battery system carried on the majority of them.

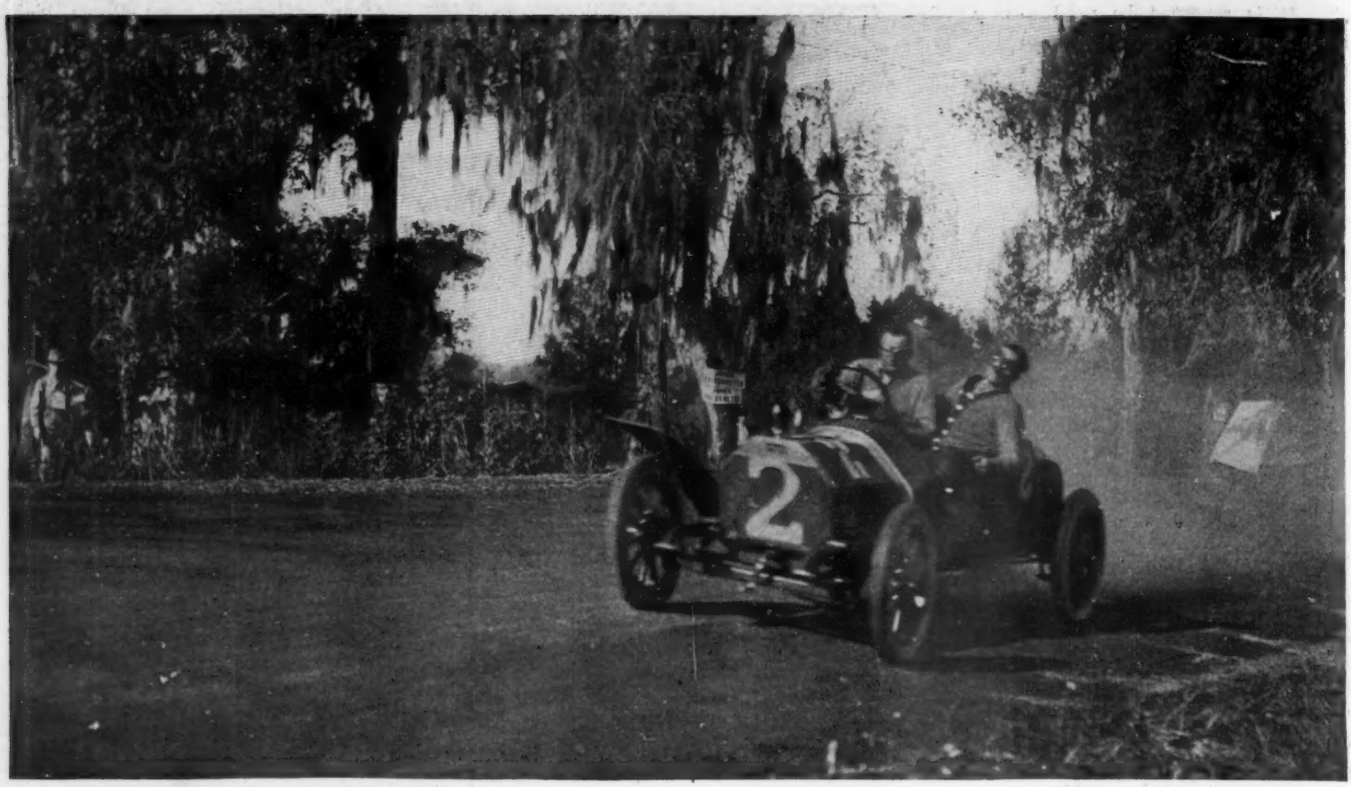
All of the Buicks were fitted with Schebler carbureters, the Chalmers-Detroits with Kingstons, the Cameron with a Breeze, the Maxwells with the stock Maxwell carbureter and the Isotta, Lancia and S. P. O. with types of their own make. There was a strong tendency shown toward three-quarter elliptic springs, in the rear, five of the cars, the three Chalmers, the S. P. O. and Lancia being so fitted; the two 4.5-inch Maxwells used elliptic springs all around and the two 5-inch ones semi-elliptics; the two Buicks with frames carried above the axles, used ellipties in rear and the two with underslung frames a style of inverted semi-elliptics which resembled two very short inverted semi-elliptics placed end to end, with a short uniting straight piece between them, which served for attaching to the axles through the usual clips. The springs on the majority of the cars were well wrapped with tape and shock absorbers, Hartfords, were fitted all around on the three foreign machines, the Lancia, Isotta and S. P. O., whereas not an American car was fitted with an absorber of any nature other than rubber bumpers and leather rebound straps.

Tire Equipment of the Cars

Nine of the fifteen cars carried Michelin tires; the four Maxwells carried Ajaxes; the S. P. O. was fitted with Pennsylvania and the Lancia with Continentals. The Maxwells had regular clincher rims; No. 3 Chalmers used the new Michelin demountable; the Cameron employed the Midgley rim; and the majority of the others were fitted with the Continental demountables. Much diversity was shown in the nature of the tire treads used, many fitting the steel-studded treads on all four wheels because of the slippery condition of the course, caused by too much oiling and the very heavy fog. The Lancia used studded rears and plain fronts; Burman's Buick had the left front plain and the other three studded.



GENERAL VIEW OF THE GRAND STAND PITS AND THE ORGANIZATION OF EACH



HILLIARD IN HIS WINNING LANCIA PERFORMING ON A BANKED TURN

KELSEY, 17; LORIMER, 10, AND EASTER, 14, ON WHITE BLUFF

Italy Conquers in Light Car Race,

SAVANNAH, GA., Nov. 25—To Italy belongs the credit of winning the first small car race in America conducted under the international racing rules, the winning car being the No. 2 Lancia driven by W. M. Hilliard, which completed the 196-mile Savannah course in 223 minutes and 33 seconds, or at a pace of 52.6 miles per hour, and beating his nearest competitor, Burman, driving No. 8 Buick, by 6 minutes and 12 seconds.

But if Italy carried away the premier honors, America took unto itself the lion's share by winning second, third and fourth places. Burman in the Buick was second, making the distance in 229 minutes and 45 seconds, or at an average pace of 51.1 miles per hour and being beaten out of the victory by trouble with his rear springs and gasoline tank in the tenth and fourteenth laps. Up to the tenth lap he led the Lancia by 4 minutes and 23 seconds, which he lost and more, too, by breaking the rear springs, which caused the gasoline tank to shake loose and an oil lead to break. The springs were not the regular Buick elliptics, but a peculiar type used because the car had been changed so that the frame was underslung. But if Burman lost by these delays in three laps he carried off the honor of making seventeen of the twenty laps in less than 11 minutes each, whereas the Lancia only negotiated eight laps under this figure. Burman's honors go still further because in fourteen laps he made the fastest time, whereas Hilliard made but one fastest lap.

Third honors went to L. B. Lorimer, driving a Chalmers-Detroit, with 233 minutes and 55 seconds, or at 50.2 miles per hour. Lorimer's time was considerably increased because of continued carbureter troubles that remained with him during the earlier laps. Fourth honors went to Buick No. 11, entered and driven by Edward A. Hearne, a Chicago amateur, who made the twenty laps in 238 minutes .04 seconds at 49.2 miles per hour. A foreign car, the Baby Isotta, a little brother of the Isotta that won the stock chassis race in Savannah last March, carried off fifth position under the pilotage of Al Poole, who drove one of its large brothers last spring. This little car, which received the name of the smallest perfect motor car ever to contest in a race in America, ran at its limit from start to finish without a stop, doing the course in 251 minutes 22 seconds, or at 46.7 miles per hour. Sixth place and seventh, also, were captured by America, the 20-horsepower two-cylinder Maxwell runabouts doing the work, Arthur See driving No. 9 around the twenty laps in 258 minutes 38 seconds, or at 45.5 miles per hour. Carl W. Kelsey manned

BURMAN IN HIS BUICK TAKING A BANKED TURN AT FULL SPEED

Won by W. M. Hilliard, in the Lancia

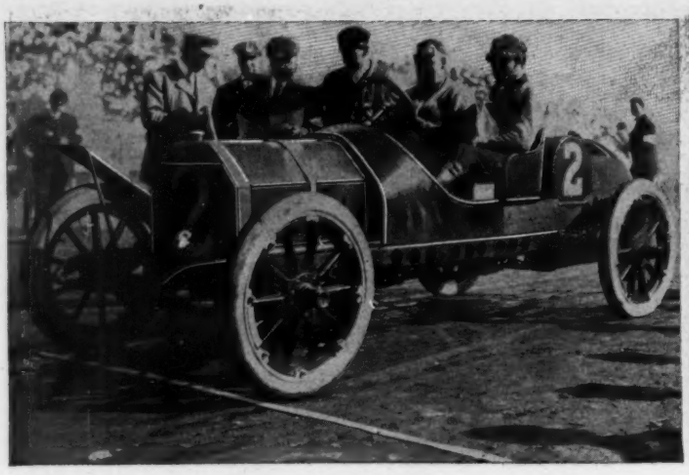
the other Maxwell, No. 17, which completed the twenty laps, his time being 260 minutes and 44 seconds, making an average rate of 45.1 miles per hour.

In addition to these cars that actually completed the course before the race was officially declared off two other cars were still running, both Maxwells, one of which, No. 12, driven by Costello, had finished eighteen laps, averaging 40.4 miles; and the other, No. 15, driven by Muntwyler, having been delayed by an accident, finished fifteen laps, averaging 34.4 miles per hour.

Of the fifteen cars that started seven completed the race, nine were running at the finish and six fell by the wayside. The first out was unlucky No. 13 Chalmers, that took the second turn in the first lap too fast and ran over the embankment, striking a tree and putting it out, but not injuring the driver or mechanician. The second car out was No. 16 Buick, driven by Jeffers, which broke a steering knuckle on the same turn in the fourth lap and withdrew. The little air-cooled Cameron No. 5 was third to leave the course, due to burning out its clutch in the sixth lap after it had set a fast pace for three laps. L. J. Bergdoll's No. 3 Chalmers-Detroit was fourth out, due to a valve dropping into the cylinder and breaking a piston. No. 14 Buick was fifth, the incident happening in lap thirteen when the rear axle broke on a banked turn and the car was ditched, completely wrecking it, and injuring mechanician Thompson, but not injuring H. Easter, who was piloting it. The sixth one to drop by the wayside was No. I. S. P. O., driven by Connors, and which car had been rebuilt after its accident. Its troubles were mostly due to too hasty rebuilding, and it ran off and on until near the end of the race.

Although America lost first place to an Italian machine, great honor is due all of its representatives, and greater honor to the imported Lancia that beat them out. The fact that the three first cars averaged over 50 miles per hour shows indisputably the possibilities of a four-cylinder car with 3.75-inch cylinders and augurs well for great activity in the small car races for 1909. All of the cars did themselves proud and astonished their fondest admirers. The fleet of four two-cylinder Maxwells was never considered a winner, not having motors enough for that, but their consistent performance showed what they are made of as well as demonstrating that they went the distance and were running as consistently at the finish as when they started.

LORIMER, 10; POOLE, 6, AND EASTER, 14, ON WHITE BLUFF



HILLIARD WAITING AT THE STARTING TAPE

FOURTH PLACE HEARNE SPEEDING HIS BUICK

This small car race was epoch-making in many respects, and the greatest regret in connection with it was that so few American makers were represented in it. This was partly due to the limit placed on the cylinder diameter, rendering it impossible for many makers to get in without making smaller cylinder castings, a task which the Chalmers-Detroit people did in spite of the short time, so short, that some of the new cylinders just reached Savannah a couple of days previous to the race and did not leave sufficient time to get them worked in properly.

From the grand stand point of view the race was most spectacular because of the fifteen cars being strung out on 9.8 miles of roadway, and often three of them in sight at the grand stand at once, in fact, so closely were they grouped on the course that three of them were snapped by an enterprising photographer on one banked turn at the same time. The length of the course was ideal for such a race, because the cars were in view throughout the entire length of the grand stand stretch, which constituted one end of the rectangle over which the course was run. They were also visible for ½ mile on each of the long sides of the rectangle, thus giving the grand stand the best opportunity ever afforded to witness a road race.

Owing to there being but four turns on each lap and all of these banked, the wear on tires was practically nil, many of the cars, including the winner, not having to make a stop because of tires. Others, notably the Cameron and Costello's Maxwell, both fitted with clinchers, had to make repairs because of punctures. The little cars were all well prepared for the fray with bodies stripped completely, many having nothing left but seats and bonnets, while not a few even dispensed with bonnets. Nothing in the rules prevented the using of larger gasoline tanks and most of them were ready at the starting line with a supply sufficient for the entire distance. Then, too, all of them realized the necessity for oil in a 200-mile race and had increased the oiler forcing oil direct to the motor. Magnetos were fitted in the majority of cases and a few other changes made to adapt the little miniature racing monsters to their double-century task. The motor design, or general design of the cars, was not altered in the least, so that with the exception of magnetos the majority of them were stock machines.

At 10 o'clock on this morning, the hours set for the start, the chances looked decidedly slim for a start, a dense fog which had been paying early morning visits to the Georgia coast being early on hand and not ready to leave that time. It was so dense that the signal men with flags ¼ mile down on the course could not be seen from the grand stand. But a quarter of an hour before the appointed starting hour Old Sol triumphed and sent the mist clouds scampering away into nothingness. The crowd began to pour into the aisles and boxes, and when 11 o'clock came more than half filled the grand stand seats and boxes. The monster bleachers, however, carried not over a couple of thousand of their 10,000 capacity. It was for these that the railroad had sold coupon tickets, and the big crowds of excursionists cared only for the big race of the morrow.

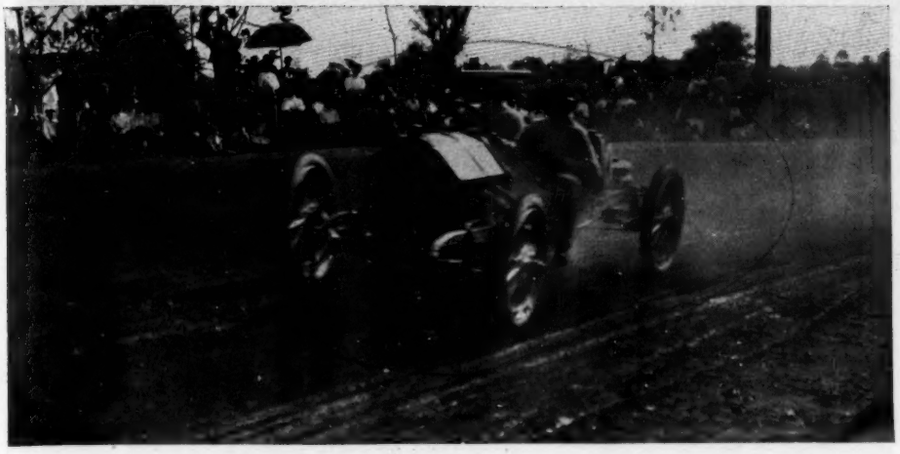
Seventeen nominations had been made for the light car race. Only fifteen faced the starter. The American Aristocrat entrant had telegraphed the management 3 days before that it would not be on hand. The Gregoire arrived on Sunday, but came in such an impossible condition that George Robertson very properly refused to undertake its pilotage.

Fred J. Wagner had had the cars drawn up in order of their start for near a half an hour. Sharp at 11 o'clock he sent the S. P. O. away. The others were dispatched at half minute intervals, except the Cameron, which started a minute behind Bergdoll, and Burman a minute behind Poole, the American Aristocrat and the Gregoire being counted, just the same as though present.

The order of the start was: Connors, S. P. O.; Hilliard, Lancia; Bergdoll, Chalmers; Cameron, Cameron; Poole, Isotta; Burman, Buick; See, Maxwell; Lorimer, Chalmers; Hearne, Buick; Costello, Maxwell; Burns, Chalmers; Easter, Buick; Munwyler, Maxwell; Jeffers, Buick; Kelsey, Maxwell.

The crowd had not many minutes to wait for the appearance of the first car. It was the Lancia. The troubles of the S. P. O. had begun early and in the first round it had dropped to the tail end of the procession, so far as the order of run-

KELSEY IN HIS MAXWELL READY TO START



LORIMER'S CHALMERS WHICH FINISHED THIRD ON A TURN

ning went. Lorimer held his place behind Hilliard. Burman made a splendid rush from sixth to third place in line, the Buick far outstripping all the others with an initial lap in 10:58, a 53.6 mile an hour rate from a standing start. Little Ewing Easter, the New York midget, had profited by his team mate's example and won second place in 11:06, actual time for his Buick.

It was up to Hilliard to be doing something, so he quickened his pace to 10:42. Even this failed to dislodge Burman from first place. Another Buick, driven by Jeffers, took Easter's place in third position. In the third round Burman increased his margin over Hilliard by 1½ minutes, and E. A. Hearne, the Chicago amateur, another Buick man, fought his way into third place, a position he kept stubbornly to the tenth lap.

Burman was evidently out for a killing and did not let up a little bit on the 53-mile gait he had laid out for himself. This widened the gap between him and Hilliard, who was driving the Italian car very conservatively ½ mile slower to the mile. Hearne clung to third and Cameron worked up to fourth in this, the fourth lap. The air-cooled car's performance was watched with some interest, as it had been backed for $50 against $1,500 in the books to coin. The Lancia, by the way, was the betting favorite at 3 to 1 against it.

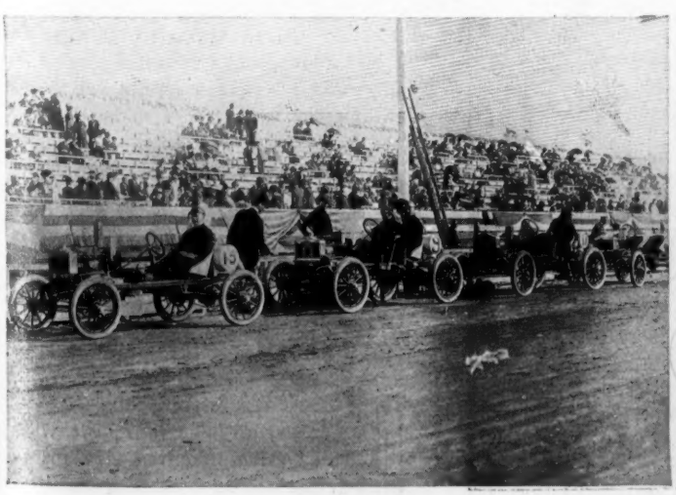
From the fifth to the ninth lap, both inclusive, the order was Burman, Hilliard, Lorimer. Cameron first bent his crankshaft in the fifth lap and in the next round was forced to retire altogether, having burned out his clutch.

The tenth round saw a shake up of the score board. Hilliard during this and the preceding round let out a kink or two of the Lancia's speed. Burman was forced to return to his camp for a missing part, which provokingly could not be found by his assistants. It cost him a loss of some 8 minutes and the race itself unless the Lancia had even more speed than Hilliard saw fit to exhibit to win. Burman's fatal tenth lap took 19:08 to run. At its end the Buick was 3 minutes 51 seconds behind the Lancia. Lorimer and Hearne all this time had been seesawing between third and fourth places.

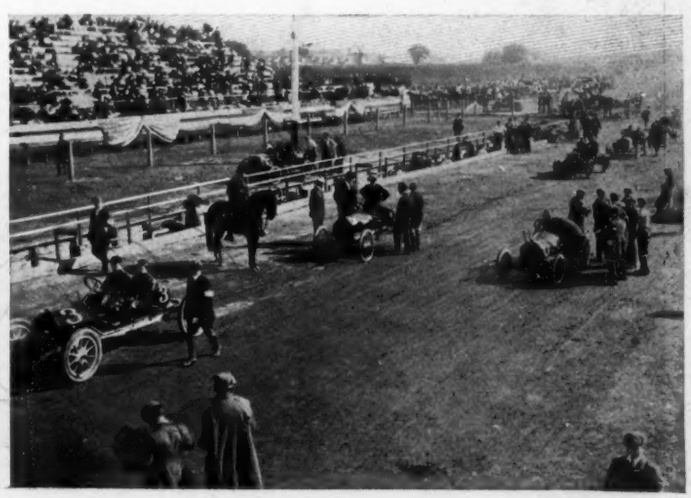
Another rather bad lap for Burman was his fifteenth. It took him 15:47 to negotiate it. It cost him second place for the time being to Lorimer. In fact, it took three laps of hard riding for Burman to dislodge the Chalmers-Detroit crack from the runner up position. In the seventeenth lap Burman regained second place. Hearne had dropped to fourth place in the twelfth round and managed to hold it to the end, pursued in order by Poole, See and Kelsey. This order—Hilliard, Burman, Lorimer, Hearne, Poole, See and Kelsey—was maintained to the end. After seven cars had finished, the referee stopped the race. Costello, Maxwell; Muntwyler, Maxwell, and Connors, S. P. O., were still running. By makes the Lancia was first; the Buick, second and fourth; the Chalmers-Detroit, third; the Isotta, fifth, and the Maxwell, sixth and seventh. All four of the Maxwell were running when the race ended. Two of them and two Buicks were officially timed.

In the battle of the tires, the Continental won first; the Michelin, second, third, fourth and fifth, and the Ajax, sixth and seventh places. Hilliard won $500 in cash, offered by the Continental Caoutchouc company for first. Burman and Lorimer carried off substantial Michelin purses.

The grand stand had many thrills during the twenty-lap duel: In the first lap Cameron, Lorimer and Hearne in the stretch together brought the grand stand to its feet, and a lap later Hearne and Lorimer entered it together with Poole's Isotta a little ahead. Just before reaching the grand stand Hearne passed the Isotta with Lorimer close at his heels waiting to perform the trick. The spectators had not long to wait before realizing that the real duel of the race was to be between Hilliard and Burman's Buick, and although the Lancia had been a strong favorite, the hot pace that Burman set from the start made the American blood flow fast in the veins of the crowd and visions were high for the Stars and Stripes floating to victory before the end of the twenty laps. Hilliard being No. 2 and Burman No. 8, the former started 3 minutes ahead of Burman, and what interested everybody most was would Burman make up those 3 minutes and actually pass the Lancia; this is what the crowd



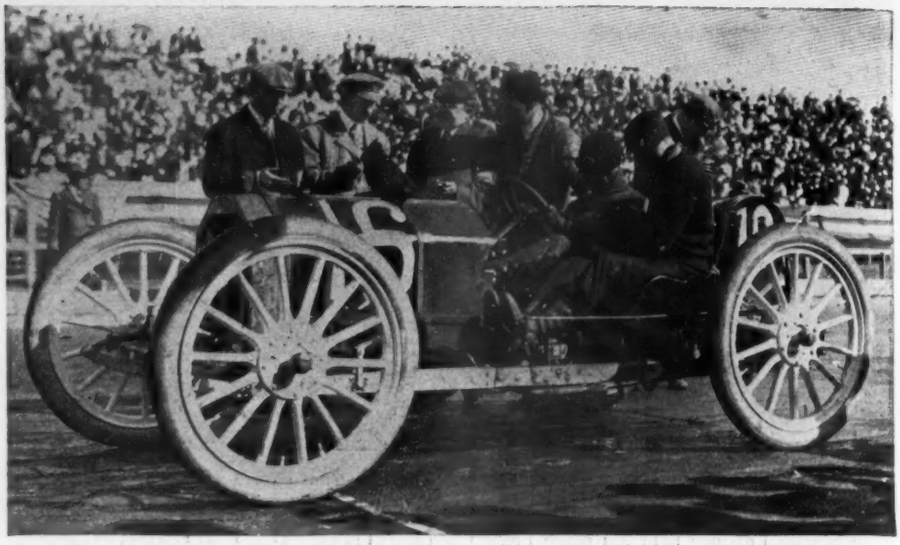
THE FLEET OF TWO-CYLINDER MAXWELLS READY TO START



GENERAL VIEW OF CARS AT STARTING POINT

watched for and for which watching they were rewarded in lap six, the act being done in plain view of all the grand stand spectators. Hilliard swung into the home stretch to finish the sixth lap and scarcely was he straightened up before Burman, coming fast, swung wide into it also. Everybody was on their feet; Burman came sweeping down close behind his rival; a moment later he pulled to the left, passed him easily and led him by 100 yards past the grand stand, this performance bringing volleys of cheers from every spectator. It had taken just six laps to eat up the 3 minutes, but the process was a gradual one. He gained 45 seconds in the first lap, lost 12 in the second, gained a whole minute in the third, annexed 18 seconds in the fourth, added 24 more in the fifth and completed the task in the sixth by making the lap 38 seconds faster than his rival.

But while following the Hilliard-Burman duel was the stellar feature of the race, the constantly changing panorama of cars fighting to the death in the grand stand stretch was constantly fraught with interest. At one time it was Maxwell racing Cameron, the next minute Hearne and Lorimer were disputing every foot of the stretch to see which would lead past the grand stand and so gain the plaudits of the multitude. When Burman flashed by in his ninth lap four cars were bunched in a few hundred yards. Soon after this Hilliard, Hearne, Easter and Muntwyler were in the stretch together, Hilliard passed Muntwyler just at the grand stand and Easter and Hearne in their Buicks were making a neck-and-neck race of it. On the thirteenth lap Hilliard and Easter came down the stretch side by side, and dashed for the turn ¼ mile beyond, where Easter took the lead. As the fifteenth lap passed interest waned a little; it was a settled fact that Burman could not catch Hilliard and Lorimer and Hearne had little chance of winning.



JEFFER'S BUICK FITTED WITH 36-INCH ROAD WHEELS

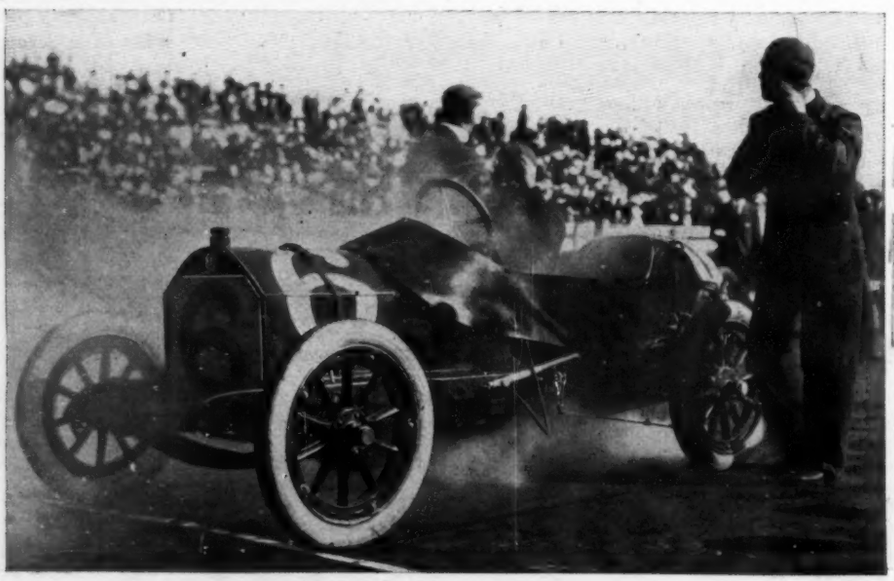
Minor Troubles and Accidents of All Sorts

THE troubles that beset several of the small cars during the ordeal were those common to larger machines, some of them being entirely due to the cars not being well prepared, while others were the outcome of carelessness on the part of the drivers. Hilliard in his Lancia was entirely free from trouble from start to finish, the only time he lost on the twenty laps being 15 seconds, when he stopped in the fourteenth lap to take on a couple of gallon cans of oil, of which the mechanic made use during the remaining laps. Throughout the twenty laps the car ran with commendable regularity, doing all of the laps in 10 and 11 minutes with extra seconds. It was the only car in the race to do every lap but one in less than 12 minutes. Lap after lap, as it came down the stretch, Hilliard seemed out on a pleasure jaunt, but results proved he was getting the maximum speed out of it on every lap toward the end.

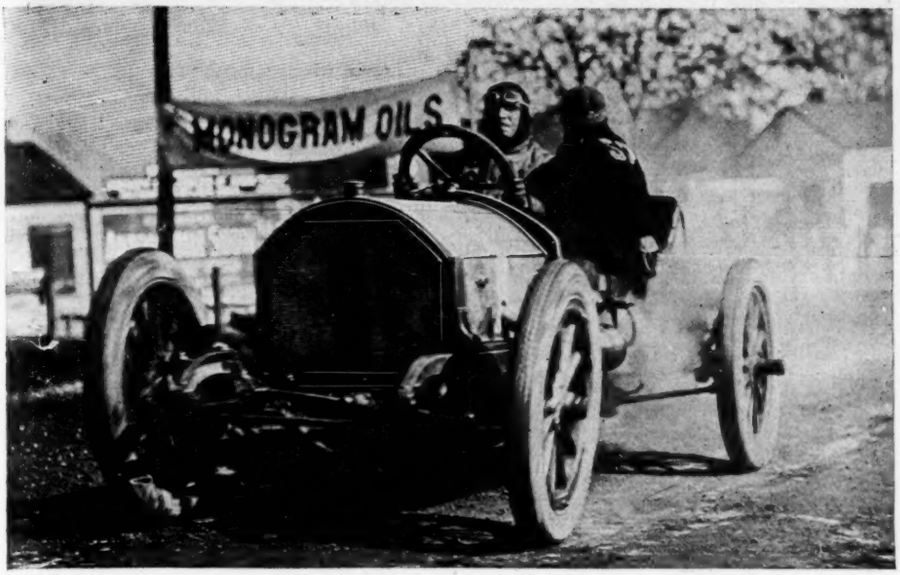
Burman's Buick that landed second honors had troubles of its own which apparently could be traced to the use of too light springs in connection with the underslung frame. On the thirteenth lap both of the rear springs broke and from that time until the finish of the twentieth the rear end of the car was carried from the axle by two chains and two straps which had been fitted as a precaution before the start of the race. As a result of these breaking the right rear brake connecting rod snapped and the gasoline tank, a large cylindrical one in the rear, shook loose, shearing off a couple of bolts in the metal straps that held the tank in place. The shearing of these bolts meant going back over a part of the course to the Buick headquarters, where other bolts could be obtained. After once being fixed the gasoline tank gave additional trouble and once or twice when the car swept past the grand stand the mechanic was holding the tank in place. Still a further outcome of the broken spring was the breaking of the oil lead from the hand oil pump to the crankcase, due to vibration, so that for the last four or five laps the engine oil supply was the splash within the crankcase. Of the twenty laps seventeen were made in less than 11 minutes each, a most remarkable performance when it is remembered that the winning Lancia only made eight laps under the 11-minute mark. Burman had three slow laps, the tenth, fourteenth and fifteenth, in which he lost practically 17 minutes' time as compared with his averages for the remaining seventeen laps. During the entire race the bonnet on his car was not lifted.

Lorimer Has Carbureter Trouble

L. B. Lorimer's Chalmers-Detroit, which win third position, required six laps before it got into proper running condition, during which time four or five stops were



POOLE'S BABY ISOTTA THE TOT OF THE LOT



CONNORS AND HIS S. P. O. WHICH RAN IN HARD LUCK

Eliminate All But Seven of the Small Cars

made because of the carbureter float sticking, as Lorimer expressed it. In several instances it was necessary to get out of the car and open the bonnet before the trouble could be rectified, whereas at others rapid changing of the throttle worked the desired results. Only once during the contest was gasoline taken on, 5 gallons sufficing, and at this time the oil supply was looked after, both being done by one man while the other worked on the carbureter. From the grand stand point of view Lorimer's performance was a race against Hearne's Buick, while Burman's Buick and the Lancia were fighting it out for first place.

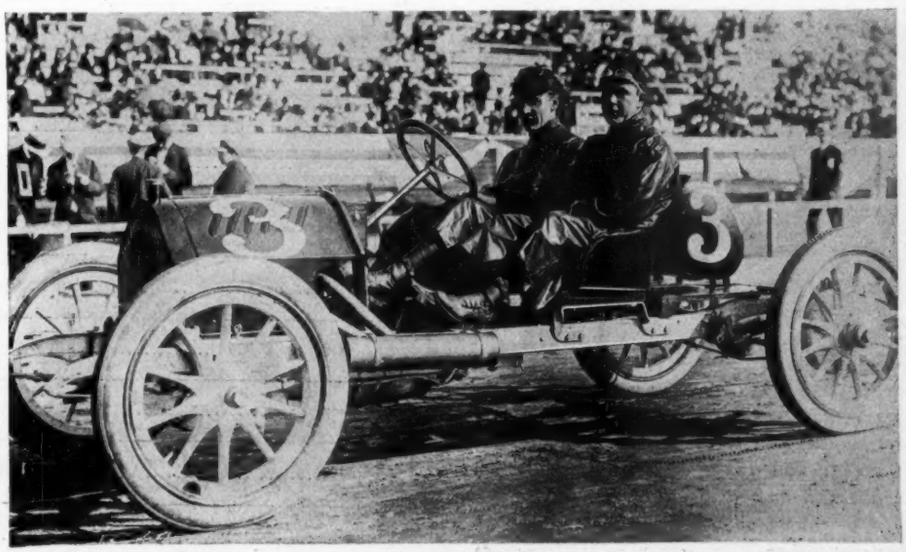
At the end of the seventh lap Lorimer passed the grand stand not 100 yards in advance of Hearne and when they bore in sight at the end of the eighth they were in exactly the same position, neither having the advantage of 10 yards over the other in the entire lap. On the ninth lap Hearne passed Lorimer, but stopping at the end of this lap for water and oil gave the latter a chance to rush past while the fuel replenishment was being made. Hearne stopped again in the seventeenth lap to take on oil and water and also to put water on the tires. Hearne made fourteen of the twenty laps in 11 minutes and some seconds, but only in the eleventh lap did he get below the 11-minute mark. All through his driving was most consistent, he having but three laps in which 13 minutes and some seconds were needed to do the 9.8 miles. His winning fourth place was a popular achievement because of his amateur standing, whereas many of the drivers he was fighting with were professional factory representatives.

Only One Stop For Isotta

Al Poole with the baby Isotta which was given fifth position made a most consistent running, the car stopping but once in the twenty laps which was at the end of the fourteenth to take on gasoline and water. Throughout the race the little motor was turning over at close to 2,600 revolutions per minute and as the Isotta factory rates it at 17 horsepower at 2,000 revolutions per minute its working power averaged close to 22 horsepower. Every time it came down the stretch it was running with the same regularity and rhythm, and it looked as if it could keep the performance up for an eternity. Sixteen of its laps were made in 12 minutes and some seconds, three of them required 13 minutes and some seconds and one was made in 11 minutes and a fraction, it never getting below the 11-minute mark. The longest lap was 13 minutes 58 seconds, the fourteenth when a stop was made for fuel. Taking the next longest which was the tenth 13:26 and the shortest the seventh 11:24 there is only 2:02 between them.

The next four positions went to the four Maxwells, No. 9, driven by Arthur See, being first and C. W. Kelsey's No. 17 next, both of which completed the twenty laps. These two were the cars with 5-inch motors of the regular Maxwell 20-horsepower variety. The other two Maxwells had 4.5-inch bore, did not complete the circuit of twenty laps but were running at the finish. No. 12, driven by Thomas Costello, had finished nineteen laps and No. 15, piloted by Joseph Muntwyler, fifteen laps. As was expected before the start, all of the Maxwells kept running and while their speed was not equal to that of their four-cylinder opponents they set an excellent example in the way of consistent running. Muntwyler's No. 15 had trouble in the twelfth lap. When speeding along the Water's road the left front wheel came off, letting the steering pivot drop onto the hard road. Muntwyler avoided an accident by noticing the wheel wobbling and applying the brakes. The trouble was due apparently, according to the driver, to leaving out the cotter pin which holds the nut on the pivot. As it was the wheel did not stop rolling until in an adjoining field. Muntwyler pluckily set to work and got it on again but had trouble with the nut because of the threads on the spindle being ruined when it fell on the road. After the first repair it ran for 1½ mile when the wheel again came off, this time unexpectedly and when traveling fast, the result being that when the axle fell it formed a pivot on the road, turning the car completely around. After a second repair the car was able to reach the repair pit at the grand stand, where a new steering pivot was secured. This delay caused 40:38 and 41:46 to be the time for the two successive laps, but in spite of which the little car kept going and was running when the race was called off.

Costello with the other little Maxwell had a puncture in the third lap, the only



BERGDOLL'S CHALMERS-DETROIT AT THE TAPE

EASTER PASSING THE LANCIA

one of the four Maxwells to have any trouble with the Ajax tires. In spite of this he made the lap in 19:23, but stopped at the grand stand and took on a new tire. This stop, being just at the start of the fourth lap, made his time in this circuit 1 minute longer than the average of the remaining sixteen laps he negotiated. Kelsey in No. 17 had no troubles of any nature and made one stop in the tenth lap to take on gasoline. Kelsey's performance was consistency personified in that he did thirteen of the laps in 12 minutes and some seconds and the remaining seven laps in 13 minutes and some seconds, there being but 1 minute 9 seconds difference between his fastest and slowest lap in the entire twenty circuits. Arthur See, driving the No. 9 Maxwell, however, beat Kelsey 2 minutes 6 seconds in the twenty laps, but did not do such consistent work, requiring 14 minutes and some seconds for three of the laps, but setting a low-water mark of 12:15 for one lap as against Kelsey's low figure of 12:44. Compared with these, however, Muntwyler with the little Maxwell made considerably faster time, doing five laps below the 12:44 mark set by Kelsey and setting a record lap figure for the Maxwell's of 12:02 or approximately 49 miles per hour for the 9.8 miles. See's car stopped in lap fifteen to take on oil and adjusted the steering gear, and in lap nineteen he stopped for gasoline.

Hard Luck For the S. P. O.

H. Connors in the S. P. O. which was running at the finish but which had just completed the fourth lap, was in hard luck from the start. The car had been rebuilt from a different model touring car after its accident of the previous Saturday and Connors and his assistants had worked night and day upon it. The back wheels had a wider tread than the front ones and several other glaring irregularities were noticeable because of the impossibility of getting duplicate parts with which to do the rebuilding. The first lap was made in 19 minutes and some seconds, but in the second trouble with the engine developed. Missing was the first indication of this and it was discovered that the end of the spark plug was broken, which was caused by a loose nut in the combustion chamber which undoubtedly got there during the rebuilding process. After this the oil lead from the hand oil pump to the crankcase broke and made it imperative to stop and fill the crankcase from the oil can. Previous to its accident this was looked upon as one of the fastest cars in the race and its performance was eagerly awaited.

Of the six cars that were not running at the finish the first to drop out was unlucky No. 13 Chalmers-Detroit driven by W. R. Burns which just covered 4 miles of the required 196 and was the only machine not to make a complete lap. On the second bank turn, namely, that off the White Bluff road onto the Montgomery cross road, the car's front wheels, provided with plain tread tires, failed to hold the turn and skidded over it and the car collided with a tree, throwing the mechanic out, Driver Burns, remaining in his seat, was rewarded for his heroic efforts by losing four of his front upper teeth and injuring the roof of his mouth by striking upon the steering wheel. The accident was not due to taking the turn too wide, but too fast for the plain tread tires. The heavy fog of the early morning was equivalent to a rain and in connection with the oil made a slippery surface. This accident occurred on the same turn that Burman in his Buick ran off of in early prac-

BEST TIME EACH LAP

Lap and driver	Time	M.P.H.
1—Burman	10:58	53.6
2—Hilliard	10:42	54.9
3—Burman	10:51	54.1
4—Bergdoll	10:38	55.2
5—Burman	10:59	53.5
6—Burman	10:42	54.9
7—Lorimer	10:12	57.6
8—Burman	10:54	53.9
9—Burman	10:56	53.7
10—Lorimer	10:38	55.2
11—Burman	10:28	56.1
12—Burman	10:30	56
13—Burman	10:30	56
14—Lorimer	11:02	53.2
15—Lorimer	10:56	53.7
16—Burman	10:37	55.3
17—Burman	10:33	55.7
18—Burman	10:43	54.8
19—Burman	10:35	55.5
20—Burman	10:30	56

TABLE SHOWING ELAPSED TIME, POSITIONS AND TIME OF EACH LAP

No.	Car and H.P.	Driver		1	2	3
2	Lancia 12-18	W. M. Hilliard	Elapsed Time.....	11.43	22.25	34.16
			Position.....	3	2	2
			Time of Lap.....	11.43	10.42	11.51
8	Buick 18	Robert Burman	Elapsed Time.....	10.58	21.52	32.43
			Position.....	1	1	1
			Time of Lap.....	10.58	10.54	10.51
10	Chalmers-Detroit 30	L. B. Lorimer	Elapsed Time.....	12.04	24.17	36.30
			Position.....	6	7	5
			Time of Lap.....	12.04	12.13	12.13
11	Buick 18	E. A. Hearne	Elapsed Time.....	11.48	23.35	35.20
			Position.....	4	5	3
			Time of Lap.....	11.48	11.47	11.45
6	Isotta 10-14	Al Poole	Elapsed Time.....	13.26	26.10	38.46
			Position.....	10	10	7
			Time of Lap.....	13.26	12.44	12.36
9	Maxwell 20	Arthur See	Elapsed Time.....	13.12	26.13	39.02
			Position.....	8	11	8
			Time of Lap.....	13.12	13.01	12.41
17	Maxwe.' 20	C. W. Kelsey	Elapsed Time.....	13.26	26.38	39.41
			Position.....	10	12	10
			Time of Lap.....	13.26	13.12	13.03
12	Maxwell 14	Thomas Costello	Elapsed Time.....	21.47	35.06	54.29
			Position.....	13	13	11
			Time of Lap.....	21.47	13.19	19.23
15	Maxwell 14	Joseph Muntwyler	Elapsed Time.....	13.17	26.22	39.16
			Position.....	9	4	9
			Time of Lap.....	13.17	13.05	12.54
1	S. P. O. 18	H. Connors	Elapsed Time.....	19.17	133.04	222.03
			Position.....	12	14	13
			Time of Lap.....	19.17	113.47	88.59
14	Buick 18	Hugh Easter	Elapsed Time.....	11.06	23.46	95.00
			Position.....	2	6	12
			Time of Lap.....	11.06	12.40	71.14
3	Chalmers-Detroit 30	L. J. Bergdoll	Elapsed Time.....	13.08	25.51	38.30
			Position.....	7	9	6
			Time of Lap.....	13.08	12.43	12.39
5	Cameron 22	F. T. Cameron	Elapsed Time.....	14.10	25.20	36.27
			Position.....	11	8	4
			Time of Lap.....	14.10	11.10	11.07
16	Buick 18	Earl Jeffers	Elapsed Time.....	12.02	23.10	173.54
			Position.....	5	3	
			Time of Lap.....	12.02	11.08	150.44
13	Chalmers-Detroit 30	W. R. Burns	Elapsed Time.....			
			Position.....	On first lap hit		
			Time of Lap.....			

FASTEST LAPS IN RACE

Driver	Lap	Time	M.P.H.
Lorimer	7	10:12	57.6
Burman	11	10:28	56.1
Burman	12	10:30	56
Burman	13	10:30	56
Burman	20	10:30	56
Burman	17	10:33	55.7
Burman	19	10:35	55.5
Burman	16	10:37	55.3
Lorimer	10	10:38	55.2
Bergdoll	4	10:38	55.2
Burman	6	10:42	54.9
Hilliard	2	10:42	54.9
Burman	18	10:43	54.8
Burman	3	10:51	54.1
Burman	8	10:54	53.9
Burman	9	10:56	53.7
Lorimer	15	10:56	53.7
Burman	1	10:58	53.6
Burman	5	10:59	53.5
Lorimer	14	11:02	53.2

tice. Not an hour or so later another car came to grief on this same turn, Earl Jeffers in No. 16 Buick being the victim. Jeffers, like Burns, was traveling fast and made the turn well, but just when straightening up on the Montgomery road the left steering knuckle arm broke, the wheel wobbled for a while and then the car headed for the left side of the road. In its trip it encountered a bank a foot high and after climbing this entered the bushes before finally stopped. As a result of striking the bank the front axle was bent and the wheels turned out at the bottom. As quickly as possible, the mechanic borrowed a mule from a colored spectator of the race and rode to the Buick camp where a spare part was secured and after being put in place the car continued for one lap.

Cameron Burns Out Clutch

The little four-cylinder Cameron air-cooled car with its 32-inch wire wheels was the next to drop out, which it did after reaching the grand stand on the fifth lap, when it pulled into the open space at the end of the pits and remained until the end of the race. Its trouble was due to burning out of the clutch. This little car made a most auspicious start, and while its first lap was a little slow the next three were made in 11:10, 11:07 and 11:01.

L. J. Bergdoll's No. 3 Chalmers-Detroit followed the Cameron withdrawal at the end of lap eleven. This car was handicapped in that it did not reach Savannah until Tuesday, the day before the race, and the 3.75-inch cylinders arrived a couple of days earlier. The regular 3.875-inch cylinder had to be removed, being too large for the race, and the smaller ones placed on. They were new and had to be worked in and there was no time for this. As a result the motor heated during the run, which caused a loss of time. Bergdoll also used bevel-seated valves and it was with one of these that the trouble arose which put him out of the running. The valves are located in the cylinder heads and shearing the pin in one of the stems against which the washer for the valve spring seating rested allowed the valve to fall into the cylinder and the piston was broken, putting the car out of racing commission.

LORIMER AND EASTER RACING

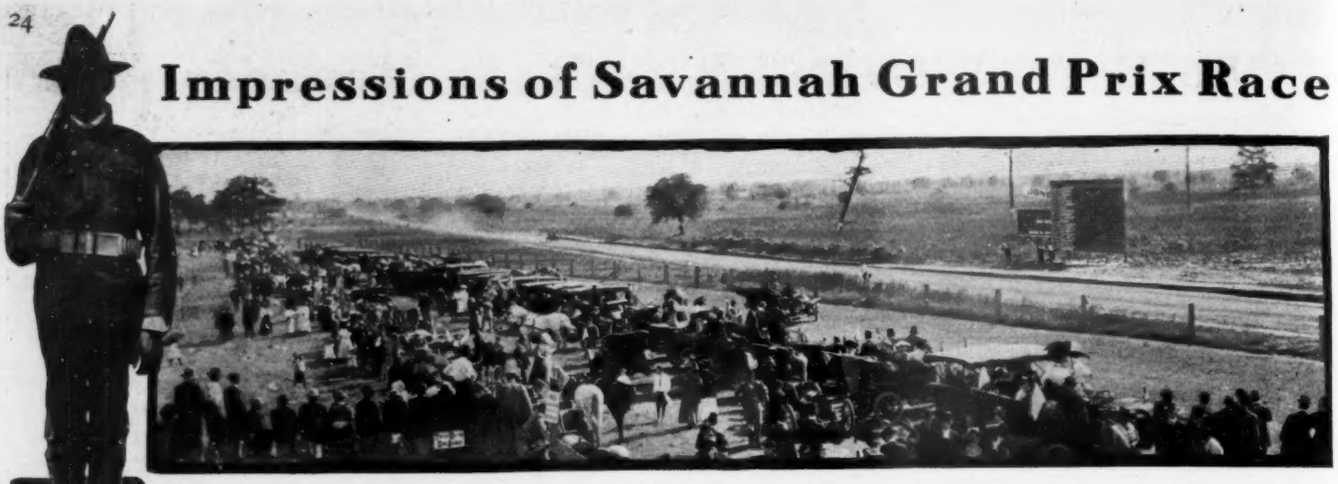
No. 14 Buick Last to Quit

The last car to drop out was No. 14 Buick driven by Ewing Easter, which broke its rear axle when making the banked turn off Water's road onto the home stretch, which resulted in ditching the car over the outside of the banked turn and severely injuring Mechanic Thompson, who was thrown heavily onto the hard road, alighting on his head and shoulders and sliding across the road. Driver Easter remained in his seat when the car somersaulted and was partly under it, but was not injured in the slightest. The accident occurred when about one-third of the turn, which is to the left, was made. The rear axle broke in the plane of the right rear brake drum and the wheel ran ahead of the car, jumped a deep ditch and ended its course in a clump of bushes across the road. Immediately the break occurred, that end of the axle dropped on the ground and tended to turn the car to the right and over the banked turn. Easter pulled on the steering wheel to resist this, but about the middle of the turn the car jumped the banking and landed, radiator on, in a deep ditch and then turned over leftward, laying on its side partly across the road. The break showed an old fracture in the axle.

IN THE LIGHT CAR RACE AT SAVANNAH, WHICH WAS WON BY LANCIA

4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Av. Mi. Pr. Hr.
45.32 2 11.06	56.55 2 11.23	68.15 2 11.20	79.32 2 11.17	91.15 2 12.43	102.14 2 10.59	113.08 1 10.54	123.59 1 10.51	134.00 1 10.51	145.51 1 11.51	157.19 1 11.28	168.46 1 11.27	179.55 1 11.09	190.52 1 10.57	201.43 1 10.51	212.40 1 10.57	223.33 1 10.53	52.6
43.31 1 10.48	54.30 1 10.59	65.12 1 10.42	76.01 1 10.49	86.55 1 10.54	97.51 1 10.56	116.59 2 19.08	127.27 2 10.28	137.57 2 10.30	148.27 2 10.30	164.14 3 15.47	176.47 3 12.33	187.24 3 10.37	197.57 2 10.33	208.40 2 10.43	219.15 2 10.35	229.45 2 10.30	51.1
48.24 5 11.54	60.38 4 12.14	72.57 4 12.19	83.09 4 10.12	94.45 4 11.36	107.03 4 12.18	117.41 3 10.38	130.41 4 13.00	142.23 3 11.21	153.01 3 10.38	164.03 2 11.02	174.59 2 10.56	186.30 2 11.31	199.13 3 12.43	212.01 3 12.48	222.44 3 10.43	233.55 3 11.11	50.2
47.26 3 12.06	59.17 3 12.51	71.03 3 11.46	82.41 3 11.38	94.16 3 11.35	105.27 3 11.11	119.19 4 13.52	130.13 3 10.44	143.57 4 13.44	155.18 4 11.21	166.39 4 11.21	178.02 4 11.23	189.21 4 11.19	201.10 4 11.49	214.44 4 13.34	226.43 4 11.59	238.04 4 11.21	49.2
51.10 7 12.24	63.53 6 12.43	77.09 7 13.16	88.33 6 11.24	100.57 5 12.24	113.14 5 12.17	125.38 5 12.24	138.06 5 12.28	150.35 5 12.29	162.50 5 12.15	176.48 5 13.58	189.28 5 12.40	201.50 5 12.22	214.11 5 12.21	226.37 5 12.26	239.00 5 12.23	251.22 5 12.22	46.7
51.43 8 12.41	64.18 8 12.35	76.52 6 12.34	89.23 7 12.31	101.55 6 12.32	114.43 6 12.38	127.16 6 12.43	139.46 6 12.30	153.53 6 14.07	166.33 6 12.40	179.52 6 13.19	194.00 6 14.08	208.03 6 14.03	220.26 6 12.23	232.59 6 12.33	245.14 6 12.15	258.38 6 13.24	45.5
52.39 10 12.58	65.33 9 12.54	78.29 9 12 56	91.26 9 12.57	104.21 9 12.55	117.12 8 12.51	130.55 8 13.43	144.48 8 13.53	157.32 7 12.44	170.27 7 12.55	183.17 7 12.50	196.10 7 12.53	208.58 7 12.48	221.55 7 12.57	234.55 7 13.00	247.56 7 13.01	260.44 7 12.48	45.1
68.54 11 14.25	82.26 11 13.12	95.44 10 13.18	108.42 10 12.58	121.58 10 13.16	135.10 10 13.12	154.45 10 19.35	165.47 9 11.02	178.50 8 13.03	191.55 8 13.05	205.06 8 13.11	221.09 8 16.03	234.26 8 13.17	247.44 8 13.18	261.07 8 13.28	Still running at end of the race		
52.12 9 12.56	64.14 7 12.02	77.59 8 13.45	90.44 8 12.45	103.28 8 12.44	115.54 7 12.26	128.33 7 12.29	140.44 7 12.21	181.22 9 40.38	223.08 10 41.46	235.51 9 12.43	255.55 9 20.04	Car still running at end of race					
259.41 13 37.38	Car running at end of race																
106.16 12 11.16	117.33 12 11.17	128.41 11 11.08	139.51 11 11.10	150.57 11 11.06	162.04 11 11.07	173.14 11 11.10	184.32 10 11.18	195.40 10 11.08	207.08 9 11.28	Car left track at Waters road and Estill avenue. Driver and mechanic both injured							
49.08 6 10.38	62.28 5 13.20	76.07 5 13.39	88.31 5 12.24	102.35 7 14.04	126.42 9 24.07	140.09 9 13.27	Withdrawn. Valve dropped into cylinder and broke piston										
47.28 4 11.01	66.27 10 18.59	Clutch leather burned															
Broke steering knuckle on Montgomery cross road																	
a tree on Montgomery cross road turn																	

Impressions of Savannah Grand Prix Race



NO PEOPLE ON ONE SIDE OF THE COURSE AND A FENCE KEEPING THEM BACK ON THE OTHER SIDE

By Victor Breyer

SAVANNAH, GA., Nov. 26—While here in Savannah the one question put to me, not once, but I should say a hundred times, has been: "What do you think of the big race?" It thus occurred to the editor that it might interest some readers of Motor Age to know what my impressions were down there. Not that my humble person is of much importance by itself, but merely because I was one of the very few French visitors in Savannah, and also on account of my close connection with last year's grand prix of the Automobile Club de France. Many people on this side not being aware of the fact, perhaps I may be allowed to mention that I was in charge of the general management of the grand prix, which took place on the circuit de Dieppe, and, by the bye, resulted in a brilliant win for Nazzaro. It was a new move on the part of the French club to nominate a special man to superintend the work, with results that for the first time in history of motor racing on our side the 1907 grand prix showed a profit, and a handsome one, too.

To revert to the race under notice, it is also a curious fact to record that outside of the competitors, I must have been the only person to witness all three of the big speed races held this year, the first in date being the French grand prix, which was again held in Dieppe and won by Lautenschlager in a Mercedes; the second being the Florio cup, which took place near Bologna, Italy, and saw Nazzaro again a winner; and the third, this last Savannah event. It may seem strange to many that I fail to mention the Vanderbilt cup race in this enumeration, but it would hardly appear a really international affair to European eyes.

Having, therefore, witnessed the above trio of big 1908 races, I am exceedingly pleased to say right here that the first American grand prize favorably compared with the other two, both in regard to sporting interest and management. In fact, I doubt if there ever was a better conducted affair, and I will confess that I have not seen or heard of any. Of course, as will always be the case with such a huge undertaking as the organization of a long distance motor speed contest on the road, some minor points may have been defective, but I want to say that they were few and far between, fewer, in fact, to my mind than was the case in either Dieppe or Bologna.

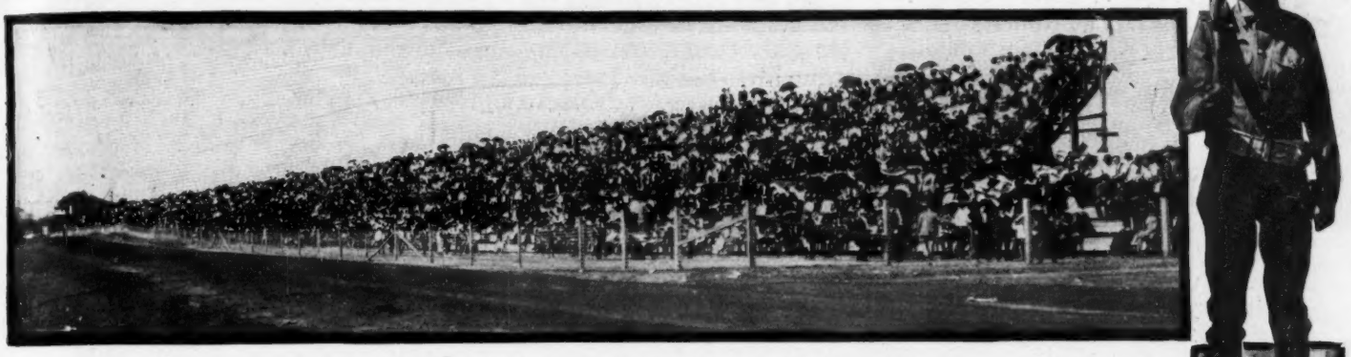
On the race itself, nobody expects me to dwell at any length, since this has been done thoroughly by men more able than myself. While the field of competitors could not be compared with the forty-eight starters in the French race, when outside of last Thursday's lot such makes as Mercedes, Panhard, Brasier and Opel also came to the post, its standard was distinctly higher than the field for the Florio cup event, out of which not only the above makers, but also Benz and Renault stayed. It looked "classy" enough and well deserves to rank as the second biggest race of the year, as far as sporting interest goes.

It may look selfish on my part, but what impressed me as being very near perfection was the press accommodations. It seemed a perfect treat to work with such facilities, comfortably seated in front of a desk, with a splendidly clear view of the course, and all information supplied you. In fact, it was too easy, I must suppose, for it so happened that I got the name of the grand prize winner cabled to Paris before the race was won. In other words, through a miscalculation on my part, just before Wagner made his sensational final appearance, I made out Hemery to have won by a small margin and flashed the news over. Luckily not more than 2 minutes elapsed before I corrected the error, but for some little time there must have been considerable jubilancy in the German camp over the other side.

It was a bit novel to me that every one seemed to be not only delighted, but also highly surprised at the way the course was guarded and kept clean. In Europe ever since the bloody Paris-Madrid race ended the chapter of town-to-town speed competitions and made way for the circuit road races, I have never seen or known it to be otherwise. But I under-

ARROW INDICATES ONE OF THE HOSPITAL CORPS ALONG COURSE

by the French Grand Prix Race Manager

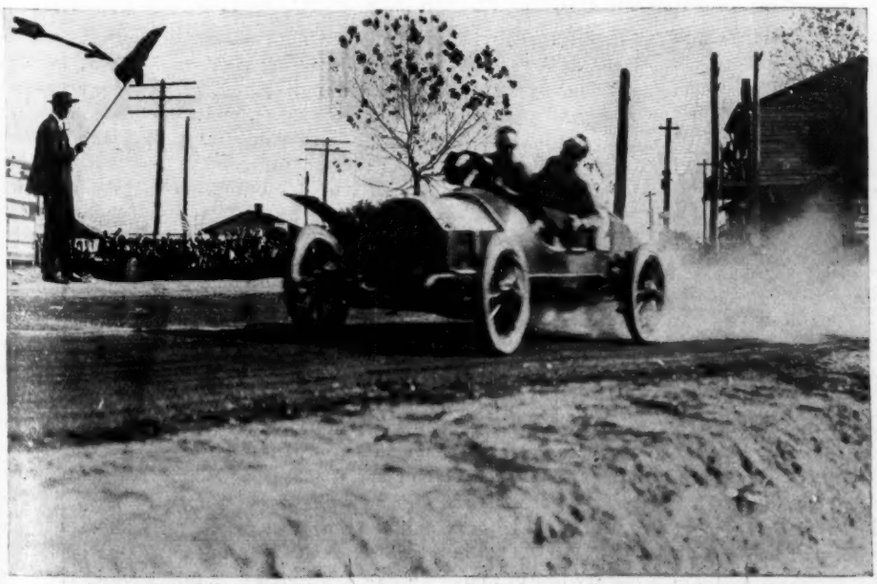


NOT A PERSON WAS ALLOWED ON THE COURSE ALONG THE BLEACHERS

stand that such has not by far always been the case in this country, and it being so, the satisfaction of the Savannah promoters was only natural. Perhaps we, too, in Franch shall have our share of trouble in that line, for just before leaving Paris I learned that a decree rendered by General Picquart, the minister of war, stated that the army would no longer be used for anything but purely military purposes in the future. Therefore, the French club may confront a very bothering difficulty in the promotion of the big race next year near Angers, as far as guarding the course goes, time alone will tell the solution of the problem.

Speaking of the course reminds me that I wish to say a word about the one in Savannah. It certainly was a tricky course on account of all the sharp turns, and now that it is all over, I wish to confess that I had my fears about accidents. Not only me, but the competitors themselves, and this is clearly shown by the fact that during the evening before the big race, two of the most prominent among the French drivers—everybody will understand me omitting names—gave me all necessary instructions in case something should happen them. At the same time three of the mechanicans started a $100 pool, the proceeds of which were to go to the widow of whoever happened to be killed in the race. All this would look ghastly enough if the event were not over and we did not know that no really serious mishap was recorded. This goes to show not only what skill must drivers in a big race possess, but also that even those speed monsters called racing motor cars are marvels as far as running, reliability and control goes. Now, again, the course was exceedingly well arranged. Of course, it was tricky and difficult and reduced the speed very much.

Another point where the A. C. A. and the Savannah promoters have us Europeans badly beaten is in the oiling of the road. Despite numerous inquiries, I am yet at a loss to understand the exact composition of the material used in Savannah, but I noticed that there was not a speck of dust on that homestretch, even when three cars came tearing along it, while on our side dust has always been a cause of nuisance. In fact, this year on the Dieppe course, despite liberal tarring, it was simply terrible.



A FLAGMAN AT EACH TURN AIDED THE DRIVERS

A matter of great satisfaction to me was the superiority apparent as regards the interest for onlookers by racing held on a comparatively short circuit. For several years I have been, on the other side, fighting for a reduction in the length of the course on which the road races are held, but with only partial success. As an example, I would say that in 1906 the French grand prix was held on Le Mans circuit, which measured over 100 kilometers—63 miles—to the lap. The year after, under my management, the Dieppe course was brought down to 77 kilometers —48 miles,— but we are yet far from the 25-mile circuit arranged for today's big race here.

In conclusion of this too lengthy article, I would really like to say a word or two of the way people down here treated the visitors, and more specially the foreigners. All the drivers who were in Savannah a considerably longer time than I was, expressed themselves as highly delighted at the reception accorded them. They even hinted about not being used to this on our side of the ocean, which was perhaps hard on us promoters, but may be true. As an instance, the attention showed the drivers in today's race in providing them with specially reserved seats from which they could view the proceedings on Wednesday, was an unprecedented thing at home, and it certainly pleased them immensely, for they expressed thanks most heartily for a consideration they never looked for.

As for southern hospitality, I suppose all has been said about it, and I could only repeat the tale of all visitors down there. Indeed, the Savannah Automobile Club members were indefatigable in their desire to attend to all the wants of their guests, and I wish to say the same of all the A. C. A. officials. As far as I am concerned, it was a great tribute paid to the paper which I had the honor of representing on this occasion, and it is a pleasant duty for me to return thanks to all the American gentlemen who did it.

Published Weekly
The Class Journal Company
1200 Michigan Avenue, Chicago
New York Office, 239 West 39th Street

MOTOR AGE

Subscription Rates
United States and Mexico, per year, $3.00 Other countries including Canada, $5.00

Entered as Second-Class Matter September 19, 1899 at the Postoffice at Chicago, Illinois, under Act of March 3, 1879

ROAD RACING CRUCIBLE OF MOTOR CAR IDEAS

It has been a favorite study of modern philosophy to indicate the steps of human progress, to watch the rising of a thought in one man's mind, the communication of it to a few, to a small minority, its expansion and general reception, until it publishes itself to the world by destroying the existing laws and institutions and the generation of new. Looked at in this general and historic way many things wear a very different face from what they show nearby and one at a time—and particularly war. War which to some men at the present day begins to look like an epidemic of insanity, breaking out here and there like cholera or influenza, infecting men's brains instead of their bowels—when seen in the remote past, in the infancy of society, appears a part of the connection of events, and, in its place, necessary.—Ralph Waldo Emerson.

ROAD races are the wars of motordom; each race is a battle royal in which orthodox design in a score of manifestations is marshaled against what the conservative designate impractical constructions and unscientific principles; yet after the reverberations of the contest have subsided and the smoke of conflict faded away motoring is one step nearer the inevitable goal of perfection; and a few more rising thoughts have been communicated to a small minority which will expand and publish themselves to the motoring world by destroying existing conceptions of design, workmanship and material and generating new. The mills of the gods grind slowly, but grind exceeding sure—the lessons taught by road races may not be generally accepted today nor yet tomorrow; but they will receive acceptance and it will be as hopeless to try to ward off the inevitable advent of these innovations, as to stand on the ocean beach and command the waves to recede.

War carried the arts and language and philosophy of the ancient Greeks into the sluggish and barbarous lands of Persia, Assyria and India; it instilled new ideas of life in savage tribes; and was the forerunner of industrial trends in many lands. So with road racing: Abroad it has developed motor constructions talked of only from the lecture platform and experimented with in the laboratory; it has turned the energy of factory research men along avenues of design heretofore deemed impossible; it has shown the possibilities of increasing motor power by diminishing the bore and increasing the stroke; it has shown how the attainment of piston speeds as high as 2,000 feet per minute and the retaining of these for hours in succession is possible; it has impressed upon makers the omni-present problem of lubrication, and the enormous increase in oil consumption beyond the direct ratio of speed increase; it has made imperative the evolution of demountable rims, incorporating the maximum safety factor and minimum time expenditure; it has shown the superiority of magneto ignition; it has demonstrated the art of proper car balance on front and rear axles; it has spurred the tire makers to a supreme effort; and it has been the great motoring thermometer, gauging the industry's progress in every department, and on whose mammoth indicating scale the motoring public can read the status of industry. Let us have road races, let us conduct them according to Savannah system and let us no longer deceive the public, but come prepared to the hour, with all the racing armor girt on and prepared to win, but if to lose then determined to lay bare the weaknesses of the cars, using these wreckages of 1908 as stepping stones by which to attain higher heights and broader views on the manufacture of succeeding machines.

The grand prize race and the international small car race at Savannah a week ago have already done the industry in America good—they would have done it a great deal more good had the scores of American makers and engineers visited the Georgia seaport and witnessed how the best cars of Germany, Italy and France perform, instead of remaining at home and telling every caller about the poor showing made by American machines. It is true American cars did poorly and they will continue to do poorly if the makers do not decide upon some consistent policy regarding speed contests. American cars did poorly because of lack of preparation. The cars were later than the foreign contingent reaching the course, and many of them went with green cylinder castings and untried parts. True they met defeat and met it bravely, and every American car even if it only completed half the laps and did it consistently, made friends and sales for its maker for 1909.

Savannah has taught America how road races should be conducted, giving its kindergarten instructions last March and its post-graduate course last week; Europe has taught us what the possibilities are in car construction and education of drivers, and now it is up to American builders to come to the fore and show that what Europe can do, Uncle Sam can do equally well, and that America's sons can pilot racing machines with speed and dexterity equal to that of any continental driver. Savannah in race execution has set the high-water mark for the world, Europeans acknowledging the excellence of its preparation, and the perfection of execution of each detail. The city promoted the race solely as an advertising scheme, the motor club, the chamber of commerce, and other civic organizations working as one for the general good of the race and the indirect value to the city. They furnished free of expense to the Automobile Club of America a course with every right-angled turn banked, guarded by state militia from end to end, protected by flagmen within signaling distance of each other, and completely furnished with hospital and telephone arrangements, all of which failed to arouse the American maker to the possibilities that southern hospitality invited him to partake of. Nine makers only responded. It is true the international rules barred not a few, but it is also true that not a few others took shelter behind that favorite fence, "We can sell all the cars we can build without going into the race, then why risk a reputation by entering?" The world may not know of reputations that may be lost and America wants cars that in road races can defeat the foreign cars, and wants them quickly. America needs makers who will build cars that will carry the eagle's supremacy across the Atlantic, and put the American car on a par with the best that the old world produces. Motor car makers owe a debt of allegiance to the country in the matter of speed contests. Whether it be between large or small cars, Europe will judge of our industry by the grand prize reports, and had America won, American cars would have received the greatest advertisement a foreign car ever received in Europe. An American victory would have been a help to every maker and would have boomed export trade.

HOTCHKISS REGIME RETAINED BY THE A. A. A.

NEW YORK, Dec. 2—Special telegram —At the adjourned meeting of the board of directors of the American Automobile Association, held today at national headquarters, the following officers were elected for the ensuing year:

President, William H. Hotchkiss, Buffalo, N. Y.
First vice-president, L. R. Speare, Boston, Mass.
Second vice-president, Ira M. Cobe, Chicago.
Third vice-president, Frank M. Joyce, Minneapolis, Minn.
Treasurer, H. A. Bonnell, East Orange, N. J.
Secretary, F. H. Elliott, New York.

President Hotchkiss immediately announced the appointment of the following chairmen of boards:

Legislative board—Charles T. Terry, New York.
Good roads board—C. Gordon Neff, Cincinnati, O.
Contest board—Frank B. Hower, Buffalo.
Touring information board—Powell C. Evans, Philadelphia.

The racing board was abolished and its functions vested in the contest board. The following executive committee, in addition to the president, first vice-president, secretary and treasurer and board chairmen, was named:

S. A. Miles, New York; H. O. Smith, Indianapolis, Ind.; William E. Metzger, Detroit, Mich.; Oliver A. Quayle, Albany, N. Y.; Paul C. Wolffe, Pittsburg, Pa.; W. C. Crosby, East Orange, N. J.; James T. Drought, Milwaukee, Wis.; W. H. Gillett, Hartford, Conn.; Frank G. Webb, Brooklyn, N. Y.; Frank M. Joyce, Minneapolis, Minn.; J. P. Coghlin, Worcester, Mass.; L. E. Myers, Chicago; Edwin S. George, Detroit, Mich.; John Pancroft, Wilmington, Del.; L. J. Powers, Jr., Springfield, Mass.; H. M. Rowe, Baltimore, Md.

The first three named were officially designated by the National Association of Automobile Manufacturers at its executive committee meeting held today to serve on the board of directors and executive committee of the American Automobile Association hereafter. This action on the part of the national body of manufacturers evidences a community of interest and cooperation that should have notable results.

A set of resolutions adopted yesterday by the executive committee declares that in the future no sanctions will be granted for meets held on tracks 1 mile in circumference or less. Drivers participating in such meets will be suspended.

Meetings During Palace Show

New York, Nov. 30—Many motoring organizations will hold their annual or monthly executive meetings during the Grand Central palace show week, the schedule being as follows:

Thursday, December 31, 3 p. m.—Private view of show; meeting executive committee New York Automobile Trade Association, 8 p. m.; "Gala night"; 10 a. m., meeting show committee, A. M. C. M. A.

Friday, January 1—Army and Navy night.

Saturday, January 2—Students' night; 10:30 p. m., show smoker to visiting motorists and dealers at A. C. A. clubhouse.

Monday, January 4, 2 p. m.—Executive committee meeting American Automobile Association; Engineers' night.

Thursday, January 7—Executive committee committee meeting National Retail Automobile Dealers' Association; Society night; 4 p. m., meeting board of governors Automobile Club of America; 1 p. m., show luncheon to exhibitors by A. M. C. M. A., Hotel Manhattan; meeting Society of Automobile Engineers.

Wednesday, January 6, 10 a. m.—Meeting of committee of management, A. M. C. M. A.; 8 p. m., meeting board of directors, Importers' Automobile Salon; executive committee meeting, Motor and Accessory Manufacturers; Merchants' night.

Thursday, January 7—Executive committee meeting, American Motor League; Municipal night.

Following its usual policy the Automobile Club of America announces a giant smoker for the Saturday night of the show which opens in Grand Central palace on New Year's eve. This affair, which will not begin until 10:30, is a recognition of the hundreds of visiting motorists and agents who will be in town. The affair is in charge of Orrel A. Parker, chairman of the entertainment committee. Show exhibitors and their friends at the show in the palace, will be provided with cards of admission.

The show committee of the American Motor Car Manufacturers' Association has settled upon a metallic button for exhibitors, dealers and demonstrators. The button has an antique gold and green vert bronze finish, and the design consists of a motor car wheel on which is "1909 A. M. C. M. A." Protruding through the spokes is the head of a motorist.

Europe Through Pierce Eyes

Buffalo, N. Y., Dec. 1—David Fergusson, mechanical engineer of the George N. Pierce Co., has recently returned from abroad where he visited the principal motor car factories of England and France and inspected the new medols of the leading German and Italian makes. As a result of his observations Mr. Fergusson says that two tendencies in construction stand out prominently above all others. The first is the wide adoption of the shaft-drive among makers who have, heretofore, produced none but chain-driven cars and the other is the abandonment of ball bearings in favor of plain bearings for crankshafts. "From present indications," Mr. Ferguson says, "not over 2 years will pass before every maker of any great prominence in Europe will have abandoned for good the chain-drive and installed a shaft-drive in all of his models. This movement is not confined to the makers of any one country but is noticeable equally in England, France, Germany and Italy. Some manufacturers have confined the shaft-drive to their new and usually lighter-powered models, retaining practically their former construction for their high-powered cars. The change to the shaft-drive for their high-powered cars is only a matter of a short time. Other makers, on the other hand, have made the change throughout their line at the same time. There has not been a single change from the shaft to the chain-drive of which I have heard. The most prominent general tendency aside from the matter of final drive is the reversion to plain bearings. Several years ago two manufacturers, one French and the other German, both of whom stood high in their own countries, adopted ball bearings for the crankshaft. The outcome of their policy was watched with a great deal of interest by motor car makers throughout the world. This year marks the definite abandonment by them of their experiment and their return to plain bearings from one end of the crankshaft to the other. This act of theirs is rather gratifying to the makers who had always advocated plain bearings and who continued to advocate them at that time. It is not probable that any other makers in Europe will experiment with ball bearing crankshafts after the experience these two makers have had with them. So far as actual business goes the foreign manufacturers have had a rather dull 12 months but affairs now appear to be in better shape and a number of factories are running at capacity."

Dates of the Shows

French Show—Eleventh annual Paris salon, November 28-December 13.

Palace Show—Ninth international show, conducted by the American Motor Car Manufacturers' Association with the Importers' Automobile Salon and the Motor and Accessory Manufacturers, Grand Central palace, New York, December 31 to January 7.

Garden Show—Ninth annual show of Association of Licensed Automobile Manufacturers, Madison Square garden, New York, January 16-23.

Philadelphia Show—Annual show of Philadelphia Automobile Show Association, Second Regiment Armory, Philadelphia, week of January 27-February 3; J. H. Beck, Odd Fellows Temple, manager.

Chicago Show—Annual N. A. A. M. show in Chicago, February 6-13.

Cleveland Show—Show of Cleveland Automobile Dealers' Company, in Cleveland, February 15-20.

Detroit D. A. D. A. Show—Second annual show of Detroit Automobile Dealers' Association, Wayne pavilion, February 15-20.

St. Louis Show—Annual motor car show in St. Louis, February 15-20.

Denver Show—First annual show of Denver Motor Club, Auditorium, Denver, Colo., February 16, 17, 18.

Hartford Show—Hartford Automobile Dealers' Association's annual show at Hartford, Conn., February 27-March 6.

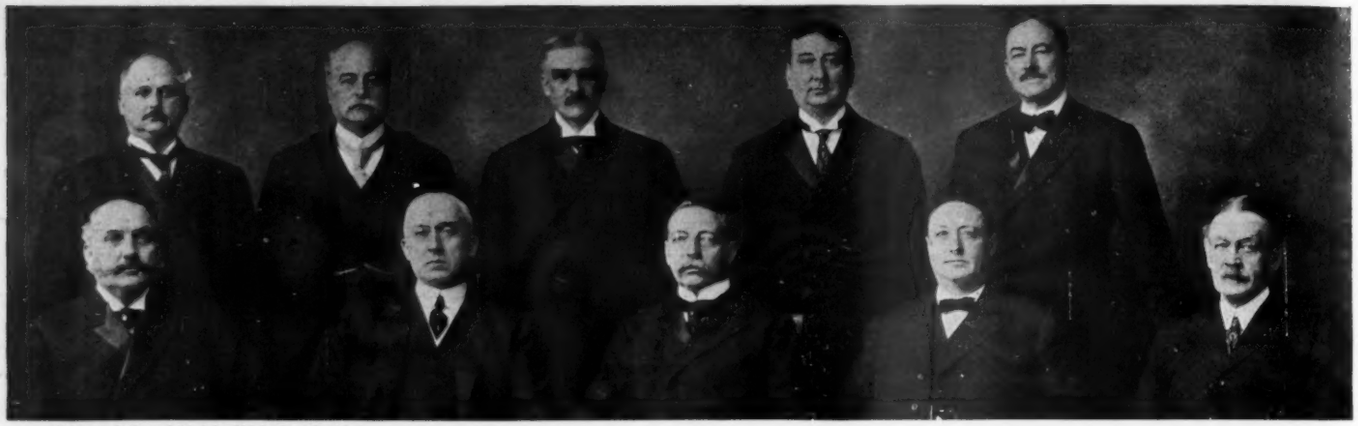
Boston Show—Annual Boston show, week of March 6-13.

Pittsburg Show—Annual show of Pittsburg Automobile Dealers' Association in Duquesne garden, March 27-April 3.

Royal Under New Colors

Cleveland, O., Dec. 1—Under the general management of George J. Dunham, former Royal and Corbin agent in Boston, the Royal Tourist Car Co. has taken over the entire plant of the Royal Motor Car Co., of this city, which has been operated under receivership for the past year. All old obligations have been settled in full and the new concern starts with an absolutely clean slate. Dunham is president of the new company; H. S. Calhoun, of Cleveland, vice-president, and Clifford A. Fuller, of Cleveland, secretary. The new Royal, the first models of which are just completed, has a four-cylinder motor, 5½ by 6, Bosch magneto double oiling system, four-speed transmission, five brakes. A self-starting device using compressed air will be furnished as an extra equipment. Robert Jardine continues as designer.

GUBERNATORIAL TIMBER DISCUSSES ROADS



Photograph Copyrighted by Chickering, Boston

NEW ENGLAND GOVERNORS MEET AND DISCUSS GOOD ROADS

Upper row, left to right—Governor Rollin S. Woodruff of Connecticut, Governor-elect Eben S. Draper of Massachusetts, Governor-elect George H. Prouty of Vermont, Lieutenant Governor Watrous of Rhode Island, Governor-elect George L. Lilley of Connecticut. Lower row—Governor Charles M. Floyd of New Hampshire, Governor William T. Cobb of Maine, Governor Curtis Guild, Jr., of Massachusetts, Governor-elect Bert M. Fernald of Maine, Governor-elect Henry B. Quindy of New Hampshire.

BOSTON, MASS., Nov. 26—Highways and motor cars took up the attention of the governors and the governors-elect of the six New England states here Tuesday afternoon when they met to consider uniform laws for the motor cars, as well as plans for the bettering of the highways of the different states. The suggestion to have the meeting, which is only the forerunner of others to be held yearly, was made by Governor Guild, of Massachusetts, several weeks ago and it met with a hearty response. It was the third session of the convention which lasted 2 days, and this one was better attended than any of the others and it aroused greater enthusiasm. Thus once again Massachusetts has the honor of taking the first step in progressive ideas. The first convention to consider roads and laws was held at Springfield, Mass., 2 years ago. This was followed last summer by the one at Buffalo. And while the one just ended was shorter and did not have as many delegates, yet it seemed to create more interest than its predecessors and gave evidence of producing greater results. No one doubts but what new laws will result and that they will be beneficial to all, motorists and public alike. The highway commissioners of the different states fraternized for 2 days exchanging ideas, and the same was true of the governors.

When Governor Guild called the session to order at 2 p. m. there were on the stage of the Tremont theater the following, representing the gubernatorial body of New England: Governors William T. Cobb, of Maine; Charles M. Floyd, of New Hampshire; Rollin S. Woodruff, of Connecticut, and Curtis Guild, Jr., of Massachusetts. Governor James H. Higgins, of Rhode Island, was represented by Lieutenant Governor Ralph C. Watrous. The governors-elect on the stage were: Bert M. Fernald, of Maine; George H. Prouty, of Vermont; Eben S. Draper, of Massachusetts; Aram J. Pothler, of Rhode Island, and George L. Lilley, of Connecticut.

There were about 600 present in the audience, among them many of the local moto dealers as well as some from other states. The session was a very interesting one because of the instructive nature of the addresses and the unanimity of opinion that excellent constructive legislation would result. Applause punctuated the remarks of the speakers frequently and it was easily seen that the motorists were on hand, for they showed their presence when something was said in their favor.

It was brought out that there is a very serious lack of unity in motor laws in this section, while at the same time New England is ahead of other sections. Massachusetts leads in some respects but not in all. That the highways need to be taken out of local control, and that nothing savoring politics should enter in the care of them was emphasized. That recklessness is being stamped out in this state was very clearly proved by facts and figures, and it was also shown that the number of people injured is not correspondingly increasing with the increase in the number of accidents.

Startling Road Statistics

The fact that Massachusetts has spent millions in good roads made an impression on everyone, and that while at present nothing has been found to withstand the wear and tear of motor cars experiments are being conducted which will result in a non-destructive highway eventually.

Facts and figures were given which proved rather startling to the assembly. For instance, it was shown that of the 2,150,000 miles of highway in this country but 7 per cent, or 152,000 miles, have been improved. These are divided as follows: 108,000 gravel, 38,000 macadam, 6,000 other filling. Of this the greater part is east of the Mississippi. That bad roads are costly was shown by these figures. To move a ton of heavy material it costs an average of 25 cents a mile. Here are some statistics:

On good roads, macadam.....	8 cents per mile
On ordinary stone roads.....	12 cents per mile
On bad country roads.....	29 cents per mile
On wet sandy roads.....	33 cents per mile
On dry sandy roads.....	64 cents per mile

That education and good roads go hand in hand was shown by these figures:

	Total population	Illiterate	Roads improved
Arkansas..... Missouri..... Mississippi.... North Carolina	7,860,000	375,000	1.51 %
Massachusetts. Connecticut... New Jersey... Rhode Island..	6,000,000	20,000	30.5 %

It was estimated that it would only cost $100 a mile annually to keep a good, first-class road in shape were it not for motor cars. Now the figure has been raised to $300. In Europe, though labor is cheaper and the hours are longer, they estimate it at that cost. That motor cars cause 53 per cent of the destruction of roads was the claim made, based on figures by Massachusetts engineers. Where we waste money is in not training men to care for roads as they do in Europe. In this connection the suggestion was made that men be secured to look after roads who will not be appointed through any political pull but because of their fitness. In this way it will stop the leaks, it is claimed.

Road Maps Are Shown

Chairman Parker, of the Massachusetts commission, had maps made which he passed around, showing the different roads in Massachusetts and where they met roads in other states. The Bay state is really a pivotal one, as on the north New Hampshire and Vermont border it, while it is but a few miles across New Hampshire to Maine. On the south there is Rhode Island and Connecticut, so whatever way the motorists go they must pass through Massachusetts.

When it is considered what attractions are offered in the New England states it is not to be wondered at that the gov-

ernors are now awakening to the realization that the motorists must be given some consideration.

That the present registration fee in Massachusetts and other states is a double taxation was pointed out by Ex-Governor Batchelder, of New Hampshire. His speech, by the way, was really a splendid defense of the motorists. It was shown that the improvement of roads led to increases of prosperity; that the more educated the community the greater the improvement in roads, and that the commissioners of New England are coöperating toward a series of trunk highways which will connect the different states so that it will be possible to traverse from one end of New England to the other over a series of splendid highways.

That fine highways induce people to come to states having them was clearly brought out, and it was argued that as New England is the garden spot of the nation it should not put restrictions on owners of motor cars which would drive them elsewhere.

On the other hand, the fact was stated that the highways should be for business first and pleasure secondly. The matter was very well threshed out, and when it ended Governor Guild stated that there would be a further meeting of the highway commissioners to frame up uniform laws, Governor Cobb, of Maine, proposed a vote of thanks to Governor Guild, which was given heartily.

Manager Chester I. Campbell, of the Boston Dealers' Association had a stenographer present who took down all the reports, and these will be printed and distributed to the dealers so that when they meet next month for consideration of legislation they will be posted on the subject. It is to be regretted that no one put the question pointedly to Governor Guild asking whether or not he was willing to ask the supreme court to pass on the constitutionality of the present motor law, rather than have the motorists fight it out to the finish.

Chairman Parker's Speech

Chairman Harold Parker, of the Massachusetts highway commission, was the first speaker of the afternoon. He has been a member of the commission 8 years and has just returned from a trip to Europe, where he and Secretary Austin B. Fletcher, of the commission, were delegates to the international road congress in Paris. Mr. Parker's subject was: "The Construction of Highways," during which he outlined the system in vogue in this state, as well as many other interesting topics. Among other things he said:

In considering the economical features of highways, I shall only bring to your attention the fact that from the earliest times the growth of the highway has kept pace with the development of the country. After the practical completion of the railroad systems of the United States the intelligence of the people directed their energies toward perfecting a system of highway communication between the farmers and the manufacturers and the railroads. The question of building roads with sufficiently strong and smooth surface to be economically used is now presented to the people of the United States and to us in New England for solution.

The state of Massachusetts was one of the first to consider seriously the question of building its roads under the authority and care of trained men. The legislature, feeling this need pressing upon the people, outlined a plan by which a commission of three suitable men was appointed to take charge of and build certain lines of road throughout the state, based upon the needs of the communities and the physical conditions. This commission has now been in existence for about 15 years, and it has built in that time nearly 800 miles of thoroughly well devised stone or gravel roads. It has taken charge of the construction of several hundred miles of town highways which have been built under the direction and supervision, but which still remain town ways.

It is firmly the belief of this commission that the methods adopted in the construction of a road should be wholly dependent upon the traffic conditions. In other words, where it might be necessary to build the strongest kind of a trap rock macadam road in the neighborhood of populous towns and manufacturing communities, it would be wholly unnecessary and unwise to use the same method of construction in the gravelly hills of the interior or the sandy roads of Cape Cod.

It has been found by long experience that, where it is possible to avoid it, a gradient of over 6½ per cent should not be permitted on a stone road. It has been determined that on an ordinary macadam road in the country the crown should be from ½ to ¾ inch to the foot, for a greater descent than this carries the water off too fast and compels vehicles to travel in the center of the roadway, thus wearing out the center more rapidly than any other part and tending to rut it; and less than this will not permit, under ordinary circumstances, of the proper surface drainage.

Whether a road is to be built of gravel or of stone, the drainage of its sub-grade and the removal of surface water are precisely the same. In short, no road should be built anywhere except upon a basis of proper drainage and proper foundation.

It is my belief that the macadam road as now built, with modifications such as different road builders adopt under different conditions, such as the use of only No. 1 stone, with a sand binder, filling the road completely during the process of rolling, where traffic is heavy, and other small changes, will not be materially changed, whatever damage may be caused by the use of motor cars on the highways. It may be, and undoubtedly will be, that a material will be found, if it has not already been found, which when placed upon the surface or embodied in the top course of a macadam road will offer a surface which will not be destroyed by the corroding action of motor car wheels. It may be proper to say here that this com-

Asks Millions for Pennsylvania Roads

Harrisburg, Pa., Nov. 30—The annual report of State Highway Commissioner Hunter, covering the work of his branch of the state government for 1907, which was made public here last week, contains a recommendation for an annual appropriation of from $4,000,000 to $5,000,000 a year for 10 years to bulid roads and outline a system of main highways. He notes the growth of good roads sentiment and reports that on the last day of 1907 325.2 miles of road had been completed and 221 miles was under contract. During 1908 the roads under contract have been completed and almost 200 additional miles added, so that the state has over 700 miles of reconstructed road or highway which is so far advanced toward completion as to be ready for service.

The most important feature of the report, however, aside from its brevity, is in the maps. The number of applications for improvement of roads and the extent of the highways covered are shown, together with maps to indicate the counties which had applied for aid in building highways up to January 1, 1904, and to the first day of this year. In the former case but eighteen of the sixty had applied, but on January 1, 1908, Juniata was the only county which had not applied and it has since asked for a mile of macadam road.

The report also contains a state map showing in red the section of highways rebuilt under the good roads act. While these stretches are widely scattered, it is easily seen how they can be connected to form continuous highways in many counties and the prediction is made that if the roadbuilding of Pennsylvania is carried on for the next 5 years at the rate now going on these roads will be joined. The report, dealing entirely with operations of last year, does not refer to Governor Stuart's proposed highway across the state, although Highway Commissioner Hunter has in the last few weeks conferred with the governor about the details of his project.

Illustrations show the work done by the department, including difficult special operations, and how dust-laying experiments are conducted, in addition to several to illustrate the stimulation given to local effort by the work of the state. These photographs, taken by Deputy Commissioner Beman, show how supervisors of Valley township, Montour county, sprayed dust layers with ordinary tree-spraying apparatus and secured good results, and how in Turbot township, Northumberland county, supervisors cut off the top of a hill to ease a sharp grade on a curve. Another shows how the road was built around Tioga county's famous elm in Jackson township to preserve the tree. The statistical portion shows that in building roads the state expended to the date of the report $3,333,726.86, or $10,295 per mile, counting in bridges, culverts and drains. The cost of engineering was 2.1 per cent of the total cost, of inspection 3 per cent, and of extras 11 per cent. The work was done in fifty counties. At the end of the year there were 1,697 applications on file, calling for 3,339 miles of road.

Summing up the work, Mr. Hunter urges that $4,000,000 or $5,000,000 be set aside each year for the next 10 or 12 years so that the department can plan a system of main highways throughout the state. Other legislation he suggests is providing for organizations of supervisors along the lines of county and state association of supervisors and that the act of 1905 be amended so as to provide for abolition of work tax and payment of the 15 per cent to townships entitled to receive it by reason of abolishing work tax. Mr. Hunter speaks of the rebulding of the National pike, or Cumberland road, in the southwestern portion of the state and urges an appropriation to put it all in fine condition. The money from motor car licenses after deducting expenses was $39,729.96, which was used for rock tests and trials of dust layers.

mission has experimented for several years in the use of tar, pitch, asphalt and oil in surfacing and even building roads, and it is not yet prepared to say what material, if any, of those now experimented with will become the material for a permanent road structure. That the motor car has introduced a wholly new condition is undoubtedly true. It is also undoubtedly true that it has caused the revolution of the theory of the macadam road.

I have often been amazed that the people of New England, who have the reputation of being intelligent and of spending their money judiciously, should permit a system to exist which practically wastes the largest part of the money which is spent in building and maintaining their highways. I think if your excellencies, and those who are working together with you, can bring about laws which shall put the highways of New England under a system somewhat similar to that of France, in doing that you will have accomplished a task for which you will receive the honor of all men.

The conclusions which I arrive at are briefly as follows: That a centralized control in every state of its main lines of thoroughfare is absolutely necessary. That a uniform method of control and construction must be adopted and carried out by intelligent and trained men. That all such authority should be absolutely free from any political influence whatever. That the persons in charge should be continued in charge during good behavior, so that a force of trained men should be developed and maintained.

From data on file in this office it is safe to say that in the country districts of Massachusetts alone a half million dollars a year is spent in the care of their roads by the towns themselves. It is safe to say that at least one-half of this amount is worse than wasted. How much wiser it would be if this same amount of money was expended intelligently, for, in the majority of towns in this state, fairly good road material can be obtained, and where now it is neglected, and where used put on improperly. A better system would make not only passable but good roads, even without greater expenditure of money. What is true in Massachusetts is true to a greater or less extent in all of the other New England states.

Talk by James H. MacDonald

James H. MacDonald, highway commissioner of Connecticut, was the next speaker. He is also president of the American Roadmakers' Association. There is no better posted man on highways in the country. His topic was: "Trunk Lines of Highways for New England." He said, in part:

It is an epoch when New England sits down for a conference of this nature. This meeting has a suggestiveness, for here the sun rises, breaking the day, and it lasts until it goes down on the Pacific. So it is right for us that we should lead in a movement of such national importance. This conference means more than is apparent. The most important question before the people of this country today is education. That has been taken care of and there is no better enlightened community anywhere today than New England. Next in importance comes highway improvement. This always follows education. It is a momentous question.

Out of the more than 2,000,000 miles of highway in this country there are 108,000 miles of improved gravel roads, 38,000 macadam and 6,000 miles of other roads that have been taken care of. Certainly this is not a proud record for our country. The highway problem has been neglected too long. New England, however, is in the forefront. Of the 153,000 miles of improved road in this country the greater portion of it is east of the Mississippi. Here in New England there are 88,000 miles of highway divided among the six states. There are twelve men in charge of the improvement of roads in these states and they have steadily improved them until a very fair proportionate share has been attended to.

Great lines of intercomunication are needed. Every capital in this country should be connected with a fine highway. It has taken 78 years to grow the railroad mileage from 23,000 miles to 238,000. This is only 6½ miles to every 100 square miles, and it is inadequate. Nor are the 2,000,000 miles of roads enough. Telephones and rural delivery help somewhat to bring the people nearer together.

In Massachusetts every important center is taken care of, and Connecticut has fourteen trunk lines of highway. The commissioners are working in coöperation to extend their systems. One of my trunk lines begins at Port Chester, N. Y., and runs along the shore for 120 miles to Westerly, R. I. That is the base of operations. There are other lines crossing the state to the total extent of 1,032 miles out of 15,000 in the entire state.

This small mileage of improved highways has been planned so that it drains a population of 851,000 out of a total of 900,000 inhabitants in the state. Therein lies its value. These roads go through 132 of the 168 towns in Connecticut. All well planned systems should consider the entrances into other states and also the business interests of adjoining states as well. But first of all it should be the business interests and then the pleasure ones.

There is being built in this country as fine roads as have been built anywhere under God's sun, and our system of repairs is unsurpassed. Yet it is hardly fair to expect that any road ever built will stand the traffic of the present day and last forever. The way to get a system of roads is to preach the gospel day and night and let the state expend money. It will return eventually. The great obstacle is how to get the money. That is one of the things we must consider. But do not delay in getting good highways under way.

Ex-Governor Bachelder Speaks

Nahum J. Bachelder, ex-governor of New Hampshire, and master of the National Grange, patron of husbandry, was the third speaker. He brought out some very good points, not the least of which was that something should be done to get a uniform registration fee. When he stated that under the present law cars are taxed as personal property and again under the guise of registration, making it double taxation, something against the principles of our form of government, he was liberally applauded. His subject was: "Motor Cars and Their Restrictions." He said:

I wish to refer briefly to the educational movement now being carried on by the farmers of the country through their principal organization, the National Grange, on behalf of the general policy of road improvement by the various township, county and state authorities, and for the enactment by congress of legislation making appropriations for the construction and maintenance of improved roads. The farmers believe that this is a purpose to which a part of the national revenues derived from taxes paid largely by them should properly be devoted, and they insist that the highways of the country are entitled to as much consideration as our waterways. They realize that the financial condition of many of the states will not permit of their making the large appropriations necessary to meet the urgent demand for better roads, and therefore are endeavoring to secure recognition of the principle that congress should by legislation provide a part of the funds needed for road improvement.

Closely allied to the question of good roads is that of the regulations governing the use of the highways by motor cars. The experience of the past 6 or 7 years has shown that the different laws on this subject in the various states have resulted in a great many complications tending to discourage even the orderly use of the motor car. In some states the natural resentment against the dangerous rate of speed at which motor cars were being operated has resulted in the enactment of unreasonable laws, which defeated their purpose by imposing regulations so stringent that they could not be enforced.

It is evident that from the point of view from which I address you—that concerted action should be taken by these states to increase their attractiveness to the summer resident—that uniformity in our laws regulating and taxing motor cars is highly desirable. While the permanent welfare of our people requires that the use of our roads shall be regarded not only as a farmer's question, but first and chiefly as a question of their commercial use, their use for pleasure or traveling being secondary to the transportation of the farmer's products to market, it must be recognized that the motor car is a permanent feature of modern life, and that the owners of these vehicles have the right to the use of the highways, subject to such restrictions as will insure the rights of all others. There would therefore seem to be no good reason why an agreement should not be arrived at upon the legislation that experience has shown to be practicable and desirable, to the end that the citizen of one state may be able to travel through other states without vexatious restrictions differing from those of his own state, and without the

Hoosiers Organize for Good Roads

Indianapolis, Ind., Nov. 30—At an enthusiastic meeting held in the assembly room of the Board of Trade building last Tuesday night, a permanent organization of the Indiana Bureau of Good Roads was accomplished. The meeting was attended by good roads enthusiasts from all parts of the state and a number of interesting addresses on the subject of good roads were made. The principal address was that of W. S. Blatchley, state geologist, who declared that in no other department of public works was the business conducted in so slipshod a manner as in the construction of roads. He said that the people put up with mud roads for almost a century and now are apparently satisfied with any sort of a makeshift in highway improvements. Mr. Blatchley said it would be far better for the farmers to pay their taxes in cash instead of working them out at $3 a day on the roads, as is done under the present system. He said the maintenance of roads should be done in a business-like manner, under competent men, and that every cent should be accounted for. In closing Mr. Blatchley recommended the appointment of a state highway commission, to have supervision over all road improvements in Indiana, fixing a standard for gravel and macadamized roads and appointing honest, experienced men to supervise the work.

Addresses were also made by Clarence A. Kenyon, who made a special study of roads in Europe during the last summer; W. H. Roberts, of the Marion county board of commissioners, and others. Officers were elected as follows: R. A. Brown, president; George C. Pyle, vice-president; J. C. Crabill, secretary, and F. I. Willis, of the Hearsey-Willis Co., treasurer. The president immediately made the following appointments:

Press committee—Frank Staley, president of the Indianapolis Automobile Trade Association; Frank L. Moore, of the Fisher Automobile Co.; J. C. Armfield.

Legislative committee—R. H. Losey, manager of the Buick-Losey Co.; George C. Pyle, Clarence A. Kenyon and W. H. Roberts.

The bureau will attempt to have the next legislature create a state highway commission and secure a law providing that the state shall pay half of the expense of road building and furnish experts to supervise the construction. Following the meeting, a conference of the good roads committee of the State Association of County Commissioners was called at the Denison hotel and the committee will meet December 16 and 17 with the Indiana Bureau for Good Roads legislative committee. These two associations expect to coöperate with the State Association of Township Trustees, the three organizations hoping to accomplish the desired reforms.

payment of special taxes not imposed on non-residents using other methods of traveling.

In considering the nature of the legislation on this subject which should be adopted by these states it must be remembered that laws limiting the rate of speed at which motor cars may be operated have two purposes. The first is, of course, the prevention of accidents through driving at high speed. A second reason is the preservation of our roads against the injury due to the rapid passage over them of these pneumatic-tired vehicles.

It is in regard to the regulations relating to the registration and identification of motor cars, and their equipment with lights, brakes, horns, etc., that there would seem to be the greatest need for uniformity. The present diversity of laws on these points makes it possible for a motor car owner who is duly registered in his own state, and has complied with all the requirements of its laws, to be an unconscious lawbreaker in an adjoining state because of a misunderstanding as to the nature of the regulations covering certain minor details. This matter should be taken up promptly by the legislatures of these states so that an agreement can be reached as to a simple code of regulations, providing for the public safety, but interfering as little as possible with the orderly and reasonable use of the motor car.

Uniformity is also highly desirable in regard to the taxation and licensing of motor cars. As these vehicles are personal property, and presumably taxed by the district in which their owners reside, a tax imposed by the state is douole taxation, and therefore opposed to our principles of government. A reasonable license fee can properly be charged, but there would seem to be no justification for imposing taxes on this particular kind of property.

In this connection I may refer to the proposition for federal registration of motor cars used in interstate travel, which has been advocated at several sessions of congress. It is not proposed that congress should interfere with the power of the various states to prescribe regulations governing the safe operation of motor vehicles but merely to provide for a system under which a motor car registered in the state of its owner's residence and also by the federal government shall have the right to travel over the roads of all other states without the payment of any additional tax. It is urged by the advocates of this legislation that its enactment will not only do away with the present system under which the citizen of one state is subject to vexatious restrictions and taxes by the various states through which he may wish to travel but will tend to further the adoption of uniform and reasonable legislation by all the states of the union.

In conclusion I would submit that there is urgent need for a concerted movement by the various motor clubs and associations to bring their influence to bear on the owners of these vehicles, with a view to securing a faithful compliance with the spirit of the laws regulating their use on the public highways. There is no question but that public sentiment is the most effective factor in checking dangerous driving, and if motorists will join in a campaign against reckless speeding they will make it much easier to secure the enactment of fair and liberal legislation on this subject.

Speed Traps Condemned

C. G. Allerton, chairman of the roads, bridges and rivers committee of the Connecticut legislature, and the father of the present motor law in that state, spoke briefly on the impossibility of officers to get the correct time in traps. Under the Connecticut law he said that every arrest meant a conviction. He told how he managed to get through a bill for the expenditure of several millions for good roads in Connecticut.

Paul D. Sargent, highway commissioner of Maine, spoke next. He gave statistics regarding what has been done in Maine. He said that this was the first year the state had begun to build highways to be known as state roads. He said that 470 towns in Maine have designated roads as state highways, averaging about 6 miles to each town and that it makes a total of about 3,000 miles now. There has been spent $800,000 in 7 years in that state. He showed how hard it is to raise money there, for with an area nearly as large as all the other New England states, the total population is but equal to that of Boston, and in valuation it is but one-tenth that of Massachusetts.

A. M. Lyman, of the Massachusetts Creamery Association, said that some attention should be given to the cross roads and byways whose poor conditions should be improved.

Vice-President Lewis R. Speare, of the A. A. A., stated that his organization was in favor of uniformity of laws, and he cited instances where there was a great difference in the various states.

Speech by Hurtubis

Francis Hurtubis, Jr., was next called upon. He made a strong plea in behalf of the motorists and showed that in some respects Massachusetts is really backward because of local regulations and the interpretation of them. He urged that a bill compelling lights on all vehicles at night should be passed in each state, and that this state, at least, should abolish local regulations. Another point he made was that the state should get at a sane registration fee as a matter of right, when the motorists contribute so much to the state yearly. He also urged that a state force be formed to eliminate the graft in local communities where town treasuries are fattened at the expense of motorists.

Colonel William D. Sohier, of the state highway commission, was the last speaker. His address was very brief, but it was one of the most interesting of the session, for he brought out the fact that the reckless driver is being wiped out in this state through the commission. He said the only way to regulate motor car travel is to take the drunken and reckless driver off the road. Here is how the Massachusetts commission has tackled the problem.

Work of the Commission

The commission this year has had 142 motor car cases brought to its attention; it has held seventy-one hearings, investigated twelve deaths, twenty-three accidents, three cases of intoxication, and has acted upon thirty-one cases passed upon by the courts. As a result of this, thirty-four licenses have been revoked, and of that number eighteen were chauffeurs. There have been fifty licenses suspended, twenty-six of these being owners, and forty-five have been dismissed with a warning or placed on file. There are 17,000 cars registered in this state, yet the curious thing has developed that while with the increase in the number of cars has come an increase in accidents, mostly collisions, yet the total list of injured has decreased one-third, and the list of deaths decreased from forty-one during the 3 summer months last year to thirteen for the same period this year.

Governor Cobb, of Maine, then stepped speech praised Governor Guild. The convention then adjourned.

Kansas Plans Reform in Road Building

Lawrence, Kan., Nov. 30—Big strides in road building will be taken by the state of Kansas, according to statements by Walter Roscoe Stubbs, the newly elected governor, who takes office after the first of the new year. Mr. Stubbs lives in Lawrence. He made a fortune in building western railroads when the country was young and as a contractor has had plenty of first-hand experience with bad roads and their relation to economical transportation by wagon. By the way Mr. Stubbs expresses himself it is certain that there will be no great delay after he takes office. At the present time there is but one stretch of macadam, and that only 7 miles long, reaching out into Kansas from Kansas City, Mo. There are a number of roads in Wyandotte county, Kansas, in which is situated Kansas City, Kan., but the topography of the country is such that the motorist does not often use the latter roads. To reach them entails some 10 miles of driving through the two cities. There was a time when the state was called "bleeding Kansas." And in those days there was no chance for rock roads, as they call them in this country, for the state was too poor. For the last 10 years, however, prosperity has come to wipe out the old mortgages and to make money for Kansas. Of course, there will not be highways across the entire state at first, but the eastern part of Kansas is to build roads, by a systematic plan, so that each link will help to form chains of continuous roads. The projects suggested by the new governor include a road from Kansas City to Lawrence and thence to Topeka, the capital of the state. Another project is to mark the old Santa Fe trail, already staked out through the whole of Kansas with red granite monuments, with a permanent road. The old trail, it may be stated for the benefit of those who are not familiar with that part of western history, was the wagon route from Santa Fe, N. M., to Westport Landing, later Kansas City. To Westport freight was brought from the east by river steamers and there it was transferred to wagon trains which toiled across the plains before the days of railroads. This road was selected for its moderate gradient and the old route, macadamized, would make one of the finest highways in the country. When the new governor takes office it is understood that there will be in his message a paragraph asking the legislature to create the office of highway engineer or commissioner, so that a comprehensive plan of road building may at once be begun. Material is close at hand, so far as regards the eastern counties of the state. The dirt roads farther west will be given the best treatment devised for their soils.

COLUMBIA IN COURT

Electric Vehicle Co. Receivers Report—Strong Possibility of Reorganization

Hartford, Conn., Nov. 30—While rumors that have been afloat for the past few days to the effect that the bondholders of the Electric Vehicle Co. would take over the business and run it have not been confirmed, it begins to look as if this plan of action will develop into a reality and that before very long. In the United States circuit court at Trenton, N. J., today, Judge Lanning issued an order authorizing Henry W. Nuckols and Halsey M. Barrett, receivers, to continue business after December 31, which was the time limit for a like order issued last July, the continuance to be until July 1, 1909. The company passed into a receivership a year ago this December.

Application for leave to continue business was made in furtherance of a reorganization plan, the idea being the purchase by the bondholders and secured creditors of the company of the claims of unsecured and general creditors at a sum, as stated in the report submitted to the court, "considerably in excess of what such creditors could hope to receive if the business and assets of the company should be liquidated by the receivers." The matter was presented to the court in the fourth report submitted by the receivers.

Under a previous order, the big plant has been kept in operation for the construction of 100 of the 29-horsepower gas cars and forty of the electric victorias. In the report submitted the receivers say that if a reorganization of the company is effected "your receivers should be authorized to further continue their manufacturing operations in the way they have heretofore done under the authority of this court, that your receivers after a careful study of the situation are satisfied that they can readily obtain orders for not fewer than 200 gasoline cars of the type known as mark 48 and fifty of the electric phaetons known as mark 69, and can complete their manufacture and sale at a profit of not less than $60,000 on the gasoline cars and $10,000 on the electric phaetons, or $70,000 in all."

Furthermore, according to the report, the receivers cannot only market the cars ordered by the court to the best possible advantage, but can also continue the operation of the factory upon a profitable basis and thereby afford the creditors an opportunity to put into effect a reorganization plan. The receivers also stated in their report that unless the necessary authorization for the continuance of business was passed, the consummation of the reorganization plan would be a matter of doubt. It appears from the report that the bondholders are now prepared to purchase and take assignments of all of the claims of the unsecured merchandise creditors provided that such assignments can be obtained for 25 per cent of their face value. A majority of those interested in the unsecured claims have signified a willingness to sell their claims to the bondholders and secured creditors and it is anticipated that all such will have been acquired by the first of the new year, at which time the reorganization scheme will have so progressed as to make its successful conclusion a certainty.

The financial statement shows a cash balance of $154,837.07, the total receipts being $427,339.86, of which amount $78,696.49 was realized from royalty on the Selden patent. In the disbursements appears the item, "Paid Association A. L. A. M. as its proportion of royalties received from Selden patent, $76,897.29." George B. Selden received $28,002 as his share of the royalty receipts. The Electric Vehicle Co., through the receivers, paid the licensed association for cars manufactured under the receivership, $3,087.64. In addition to the $154,837.07 cash balance in Connecticut and New Jersey there should be added about $20,000 cash in the hands of the Illinois receivers, about $8,000 from the New York receivers, and about $5,000 in the hands of the Massachusetts receivers, making an approximate cash balance of nearly $188,000. It is generally conceded in this city that the plan of reorganization will take definite form in the very near future.

ROAD TAX FOR MISSOURI

Jefferson City, Mo., Nov. 30—By the provisions of an amendment to the constitution of Missouri, passed at the recent election, the state will be enabled to levy sufficient taxes for road purposes to carry forward the plan for cross state highways. Such main roads were proposed 2 years ago, but, owing to the unwillingness of several counties to build roads so as to make them parts of a system, not much progress has been made. The amendment mentioned allows a levy of 25 cents on the $100 valuation for road and bridge purposes. Curtis Hill, state highway engineer, in trying to build a road from Kansas City to St. Louis, has encountered peculiar difficulties. For instance, if there are two larger cities in a county, the sentiment of the population generally has been to connect the towns. This might make the road run north and south, when the engineer's plan was for an east and west direction, to fit in with his general scheme. For such reasons the trans-Missouri highway has progressed slowly. What the new amendment may mean can be seen from these figures, taken from Jackson county, which includes Kansas City. On the basis of $170,000,000, which represents Jackson county's valuation, a 25 cent tax would yield about $400,000. For taxation purposes, property in Missouri is assessed at only 40 per cent of its value. Jackson county, by reason of the share it gets of every dramshop license issued within its borders, now spends $200,000 annually upon its roads. This money goes into a special fund for road improvement.

WANTS THE DUTY CUT

Representative of the Importers Asks Congress for a Reduction to 30 Per Cent

Washington, D. C., Nov. 30—Charles H. Sherrill, of New York, representing the Importers' Automobile Salon, appeared before the ways and means committee of congress last week and advocated a reduction in the present duty of 45 per cent on imported motor cars. He stated that an extremely small per cent of foreign-made cars arrives in this country in a finished condition, considerably over 90 per cent being landed here either in an unfinished condition, which necessitates for their completion the addition of machinery parts made in this country, or else they arrive here as naked chassis. He claimed that not only does the foreign motor car contribute to the United States by paying the tariff duties, but immediately upon its arrival here it begins to contribute to the wealth of the nation. in the way of purchased American machinery, labor, etc. The following excerpts from Mr. Sherrill's argument are of interest:

Of how great an advantage this is to the manufacturer and the workmen of the United States can be seen from the fact that the importers composing the Importers' Automobile Salon have paid American carriage builders over $1,000,000, and also an equal sum to American manufacturers for mechanical parts, tires, etc. Before leaving this point it should be remarked that as the average American-made motor car has its carriage body built in its own shops, it is to the foreign-made motor car that the carriage builders of this country owe the fact that they have not been severely embarrassed financially by the fact that carriages are being rapidly driven out of the field by motor cars. The carriage-building industry in New York city owes a great debt in this regard to the enormous orders it has secured from the importers of foreign-made motor car chassis. How beneficial this trade is to the American carriage builder may be judged from the fact that foreign-made chassis during the 4 years ending June 30, 1908, are reported by the New York custom-house to have aggregated in value $16,896,983.71, and for over 90 per cent of these chassis carriage bodies were built by American carriage builders.

Another service rendered to American manufacturers by foreign motor car factories is the splendid manner in which they have assisted to introduce the use abroad of American machinery. In many foreign countries it has proved difficult to persuade them to accept our machines, and therefore it has proved most beneficial to our manufacturers that foreign motor car makers have taken the lead in purchasing American machinery. The valuable reports compiled for our department of commerce and labor by Captain Godfrey L. Carden, after his examination of foreign motor car factories, are most instructive in showing what a large outlet they provide for American machinery. The plant of the Fiat company contains $200,000 worth of American machinery, that of the Hotchkiss company $175,000, etc.

Friends of the present tariff and those in favor of increasing it are fond of making statements to the effect that all foreign workshops contain much cheaper labor than we employ for the same purpose in this country. There is a marked exception, however, in the case of foreign motor car factories, for it is a fact beyond contradiction that the grade of skilled labor used in the foreign factories is considerably higher than that employed for the same grade of work in this country. There is a difference between the scale of wages abroad and in the United States, but a fair statement of that difference is to say that it is only from 30 per cent to 33 per cent lower than the amount paid for the same grade of work here. Many advocates of a protective tariff admit that the tariff duty should represent nothing more than the difference between the scale of wages abroad and at home; if their argument is to be accepted, then the present tariff of 45 per cent on foreign-made motor cars should be reduced to 30 per cent or 33 per cent. This seems the proper point at which to refute a misleading statement which

has been generally circulated throughout the country by American motor car companies, to the effect that a great deal of the work in foreign factories is performed by apprentices who receive no pay. This is not true. Three or 4 years ago a French law was passed which prohibits apprentices from working in a shop with other workmen; those who wish apprentices are required to provide special shops for them and pay skilled mechanics to instruct them.

Mr. Sherrill then went on to tell about the Selden patent, controlled by the licensed association. "We allege," said he, "that the only people who oppose us in our request for a reduction of the tariff on foreign-made cars are a group of American manufacturers who hope by that opposition to keep the tariff where it is at present and thus enable them to charge the American purchaser a higher price for a motor car than is represented by a fair profit to the manufacturer." He maintained that a reduction in the tariff on cars would result in a corresponding reduction in the selling price of all motor cars, whether of home or foreign manufacture; that a reduction in the selling price would mean an increase of cars sold, whether home-made or foreign.

Asked by a member of the committee as to what would be the effect of a reduction in duty on the revenues to the government, Mr. Sherrill said he believed it should very largely increase it. At this point the chairman of the committee stated that no one had appeared before the committee and asked for a higher duty on motor cars. The question was whether it would not be a good revenue producer. Mr. Sherrill suggested that if the duty was reduced to 30 per cent it would increase the revenue.

Representative Hill wanted to know if there was anything more decidedly an article simply of luxury than a high-grade motor car, and if it was not the policy of every country to tax luxuries for the purpose of revenue. To this Mr. Sherrill replied that he would have agreed with this sentiment a year ago, but he doubted if any man who knows how the motor car is now used in this country would maintain that it is simply a luxury. He pointed out that even the high-grade machines are largely used for business and can no longer be considered simply luxuries. Judging from the questions asked by the members of the committee the proposition to reduce the duty to 30 per cent is not favored.

BALTIMORE SHOW PLANS

Baltimore, Md., Nov. 30—Whether or not a motor car show will be held in Baltimore next month will be definitely decided at the next meeting of the Automobile Club of Maryland. It seems certain now that if such an exhibition is held it will be under the supervision of the club and not the dealers. The latter have not broached the matter and from remarks heard in some quarters they do not seem to be in favor of an early show, at least. The matter has been talked of the past week or so by some of the club members, with the result that it has been decided to reach some definite conclusion at the next meeting. December is favored most.

QUEER KIND OF CLIMB

Providence Officials Withhold Time Made in Hill Contest for a Couple of Weeks

Providence, R. I., Nov. 28—A hill-climb at which the officials decided not to give out the time made by the cars for at least a couple of weeks was held by the Rhode Island A. C. today. It was the annual climb of the club, but for some reason or other the officials could not get entries enough to make a respectable showing. Four classes with six entries, some of them doubling up, making a total of 10, was the story.

The climb was held on a hill at Foster, some 16 miles from here. The incline, according to some people, is ⅔ mile and others say it is more than ½ mile. It has a grade of 7 per cent. There were four cars in the feature event, which was a free-for-all. L. F. N. Baldwin, driving the Stanley racer which competed at Ormond and other places, was conceded to have first place cinched in this as well as other events, and so it proved.

Baldwin raced up the hill like a meteor. Near the top there is a curve and he shot around there on two wheels. The spectators held their breaths, expecting to see him topple over. There were three gasoline cars in this same event, a Knox, driven by W. A. Bourque; a Pope-Hartford, driven by Grady, and a Corbin, driven by Matson. This was Matson's first appearance in competition since he broke his arm some months ago.

As the official figures were not given the best that could be learned was a sort of unofficial time taken by spectators, which placed the cars in this order: Stanley, Knox, Pope-Hartford and Corbin. The time as it was snapped was: Baldwin, Stanley, :34; Bourque, Knox, :40; Grady, Pope-Hartford, :43; Matson, Corbin, :46. Others said the Pope-Hartford was :41 and the Corbin :43.

In class 3, cars of 24 to 40 horsepower, Bourque in the Knox, that had taken second in the free-for-all, got first, with a Corbin, driven by F. J. F. Corbett, second, and a Jackson, driven by Carroll M. Linton, third. The time was said to be :40 for the winner. The stock steam cars had two Stanleys entered and the one driven by Baldwin won from the other driven by Blackington. Baldwin's car was not the one he used in the free-for-all. No time was caught for this.

There was one other event, this being for cars of from 15 to 24 horsepower. One entrant showed up, Oliver Light, in a Chalmers-Detroit car. He went up the hill at a furious clip but just how his time compared with the others will be known later.

It was certain that Baldwin made the best time of the day, this being gathered from several watches held by outsiders, and therefore he wins the C. Prescott Knight cup. This cup was put up 2 years ago and had to be won three times to become the permanent property of any one. Baldwin has captured it three times successively.

One of the reason given out for the officials withholding the time was that under the new law racing on the highway is illegal and to have given out the time naturally would be conclusive evidence that the drivers had broken the law.

SITUATION IN WASHINGTON

Washington, D. C., Nov. 30—An unmistakable drift toward stability is perceptible in the local motor car trade, due undoubtedly to the optimism spread by the result of the election and the general improvement in industrial conditions. Not in months has there been such a cheerful sentiment in the trade or such confidence expressed in the future. An interesting feature of the local trade situation has been the placing of a number of new agencies. More new agencies have been established here during the past 2 months than during the past 2 years. The Commercial Automobile and Supply Co., which formerly handled the Wayne, has taken the E-M-F agency, and is now in the midst of extensive improvements in its salesroom and garage at 1313 New York avenue. The Brush-Nichols Co., which handles the Brush, has recently added the Oakland. Extensive improvements have been made in the salesroom of the Pope Automobile Co., of Washington, agent for the Pope-Hartford, Waverley, Matheson, and Autocar. The line was augmented this week by the addition of the Oldsmobile. Lester D. Moore, Jr., who handles the Premier and Reo, has removed his salesroom from 814 Fourteenth street to larger quarters at 829 Fourteenth street, and has added the Jackson. The Luttrell Co., Packard and Buick agent, has removed from 1911 Fourteenth street to better quarters at 1028 Connecticut avenue. Charles E. Myers, who operates the New Union garage, has taken the Elmore agency, which was formerly handled by H. Cornell Wilson & Brother. The latter has taken the Woods electric agency. As the result of an act of Congress a Franklin fourteen-passenger motor omnibus is to be run in Sixteenth street in Washington, and if it gives satisfaction an order for ten others is to be given. In this street the Metropolitan Coach Co. is preparing to replace with motor vehicles the present horse-drawn herdics, at the approaching departure of which there is rejoicing among the people of Washington, who have long complained of their appearance and service. The Cook & Stoddard Co., which handles the Franklin in Washington, has secured a trial order, and the larger one is in prospect. The first omnibus is soon to be delivered. It will be in service 17½ hours a day, running in that time 120 miles, it is estimated.

The Readers' Clearing House

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems and invites a discussion of pertinent subjects. Correspondence is solicited from subscribers and others.

PETARD'S SINGLE-CYLINDER MOTOR

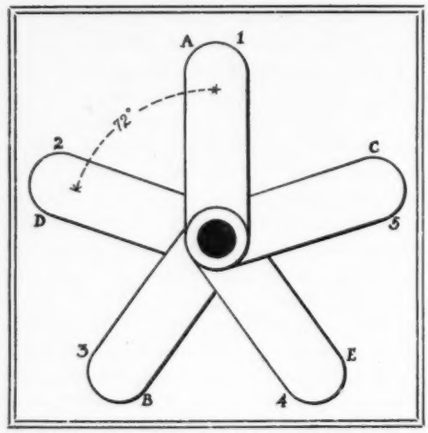
OKLAHOMA CITY, OKLA.—Editor Motor Age—In Motor Age issue of November 19, page 15, in an article on "Some Prophecies on 1909 Racing Cars," by Rene M. Petard, a statement was made under the sub-division headed "Magnetic Spark Plug Coming," to the effect that 25 horsepower was obtained from a single 4-inch bore cylinder. I believe many readers of these columns would like to know a little more about the engine and accessories which give this result. Can Motor Age give the address of the makers of the car and engine?—W. E. Thompson.

Motor Age is not certain as to the single-cylinder car Rene M. Petard had in view when making the statement referred to, but it may be the single-cylinder 6-horsepower Sizaire-Naudin, which made 65 miles 755 yards in 1 hour on the Brooklands track, which is a world's record for a car of this type. The single-cylinder used has a diameter of 3.934 inches and 10-inch stroke and it was reported the crankshaft speed was in excess of 2,500 revolutions per minute. It is obvious that at such crankshaft speed the horsepower produced would be greatly in excess of 6.

CHARGING STORAGE BATTERY

Louisville, Ky.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House, give some information on storage batteries and the ignition system of a motor car? In many places through Kentucky it is impossible to get these batteries charged at garages, and I would like to know the general method used for charging them.—Reader.

In charging a storage battery of the nature you mention, the following information, which applies particularly to the chargement of a Vesta battery, will be of assistance: The charging rate of this battery is 3 amperes and it requires 20 hours to give it a full charge. Each time the battery is put on charge, a 10 per cent solution of sulphuric acid should be added to each of the cells. This will take the place of any evaporation which may occur during the charge, and will also keep the density of the electrolyte at the proper strength at all times. Care should be taken to connect the positive wire of the charging circuit on the positive side of the battery and the negative wire on the negative side of the battery. When the charge is completed, it is well to allow the battery to stand and soak up what solution it will and then remove all surplus solution with a small syringe. A new battery does not give its best results until after it has been charged two or three times. In setting away a battery



EXAMPLE OF FIVE-CYLINDER MOTOR

for any length of time, when not in use, it should be set away fully charged and kept in a room of moderate temperature. A good many times an owner will state that an electrician in his town has advised him to take the battery apart and the plates out, and wash the battery out thoroughly, and then, in the springtime, put them back again. These directions apply more particularly to large-power batteries, and it is not necessary to go to this trouble to properly take care of an ignition battery. If it is fully charged before setting away, and kept in a moderate temperature, you need fear no trouble whatever in this line.

There is no way of telling, by means of any instrument, how much is in a storage battery at any time. A storage battery retains its voltage practically the same until the end of the discharge and then drops off rather quickly. If allowed to stand for a while, after being completely discharged, it will recuperate enough to show good voltage, although there is no current back of it. The drop in voltage in discharging is so slight that it is hardly noticeable; therefore, there is no definite knowledge gained by testing with a voltmeter. If an ammeter is used, it is a dead short on the battery and shows what it will deliver on a short circuit and it might flow as much as 100 to 150 amperes. As it is very injurious to short circuit a storage battery, an ammeter should never be used.

It is good advice to charge the battery every so often; that is, if the battery runs a car in the neighborhood of 800 to 1,000 miles on a charge, and averages from 200 to 250 miles per week, the battery should be recharged every 4 weeks. There is no danger of overcharging, as 3 amperes is a very slow rate of charge, and if a battery is left in circuit for a few hours overtime, what little overcharge it may get will not injure it. In fact, a little overcharge is a good thing for a battery once in a while.

When it comes to charging a battery where only alternating current can be obtained, it is a somewhat difficult matter. A motor generator is the best way of doing it. As this is quite an expensive outfit to install, it is not practical for the average owner to use it. As to the chemical rectifiers, which can be bought for in the neighborhood of $20 to $25, they are not very efficient as to the amount of current they consume. If the current costs the customer 10 cents per kilowatt, or more, he could not charge his battery for less than $1 for current. Many car owners make arrangements with electricians at power plants to charge their batteries from the exciter, this being a direct current dynamo used to excite the fields of the alternator. This is usually 110 volts, and to do this the course of procedure is the same as on any 110-volt circuit, on which as many as four batteries can be charged at one time. For each battery added to the circuit it should be left on charge an extra 2 to 3 hours per battery. In charging, the connections are made with the 110-volt direct current mains, as illustrated, and three 32-candlepower 110-volt lamps are put in circuit. Should a 220-volt current be used it will be necessary to use six 220-volt lamps as resistance in place of the three 32-candlepower 110-volt ones.

FIVE-CYLINDER MOTOR

La Crosse, Wis.—Editor Motor Age—The evolution of the gasoline engines as applied to motor vehicles, bringing about an increase in the number of cylinders, seems to have skipped the number five in its progress. There are four-cylinder cars and six-cylinder cars, but the writer has not heard of five cylinders being used in the commonly accepted type of multiple cylinder motors. Why is this? The answer might be that an addition of 25 per cent of power to that developed in four cylinders is inadequate to the additional expense of the difficult crankshaft construction alone, not to mention other expense features, six cylinders giving 50 per cent increase being preferable. And, in these days, when lower-priced cars are receiving the attention of manufacturers, the matter of whether one or two cylinders more than four, may, perhaps, be neglected by many makers. But for smooth running and perfection in cars of 35-horsepower to 50-horsepower, why not five cylinders? Why not five instead of six? To

be sure, they could not be mounted in pairs, but many makers now assemble six singly. Five cylinders certainly provide an ideal order of rotation and firing for two-cycle work. Say with the five cranks distributed at equal distance around the circle of the crankshaft, numbered backward, and placed in the alternate order around the shaft, 1-3-5-2-4, in order of position along the row of cylinders, a nearly perfect order of rotation and firing is the result, while in four-cycle work, with the cranks arranged consecutively around the circle, the same order of firing as above is attained, the cranks receiving the firing alternatively, twice around the circle, without interruption of that order. In four-cycle work the alternate order of cranks around the circle results in firing consecutively in the cylinders. If this consecutive action in either case is undesirable, because of vibration or other reasons, then a division of the consecutive order may be effected as follows:

Positions of cranks, equi-distant around circle of rotation.....	1	4	3	2	5
Order of firing.....	A	E	B	D	C
Cylinders numbered from front to rear	1	2	3	4	5

As regards balance, the location of the cranks at five equi-distant points on the circle of rotation would seem to tend to that result. Then, too, the difficulties attending the demand of a six-cylinder motor upon the carbureter and the possibility during the overlap of one cylinder pulling the charge from another would be considerably lessened in a motor of five cylinders. A few points, applicable to other multiple-cylinder motors might be mentioned: As, crankshaft somewhat offset, piston connecting rods as long as consistently possible, high-tension magneto, with perhaps an extra complete magneto, fitted and carried to replace, in emergency, etc. What are the weak places in the above scheme for five cylinders? Will Motor Age, or the designing engineers contingent of Motor Age readers, please answer the following question: Why not a five-cylinder car?—C. H. G.

Your communication is very interesting, but there is a reason for the four-cylinder as well as the six. The six-cylinder has been selected because the kinetic balance is more perfect than in a five-cylinder, or in any type of motor with fewer than six cylinders. The original reason for using more than one cylinder in a motor was to obtain the desired power capacity with minimum weight. When designers find it to their advantage to use more cylinders, rather than increase the diameter of the fewer number of cylinders, they have taken into consideration two factors—kinetic balance and static balance. The static balance is not difficult of attainment, since it demands symmetry of figure and equal weight at equal radii spaced 180 degrees. The weights do not have to be in the same radial plane for a static balance. It is even possible to arrange a static balance, with unsymmetrical shapes, by using balancing weights, but directly rotation is set up the static condition is displaced by the mass in motion, which motion may be uniform or it may be accelerating. For the condition of rest, equal and apposite weights of equal radii will remain at rest, even though they are not in a common radial plane. Directly motion is imparted, the difference in planes will assert itself, and lack of symmetry will introduce disturbing moments. The fifth crank, and its relation, would not balance an opposite force in any plane sufficiently to afford the real kinetic balance of the 'six.' In other than motor car work a five-cylinder motor is used, and evidently the difference in running balance is not so very great as to preclude the use of the 'five,' if the platform is stable, and if the weight in the base is so great as to assure a low center of gravity. Carbureters work well on eight-cylinder motors, so that there should be no insurmountable difficulties in connection with six cylinders. The off-set to the crank is a matter besides the number of cylinders. All the accessories you name could go with any number of cylinders.

REMEDYING FORD TROUBLE

St. Ansgar, Ia.—Editor Motor Age—C. L. Montroy's statement, in the Readers' Clearing House, issue of November 19, page 22, concerning the drop of his valve lifters just before opening the valve is correct, as I have noticed the same thing while overhauling Ford engines. I proved it was not due to anything sticking by tightly pressing the lifter against the cam and rocking the flywheel backward and forward. If the camshaft is turned backward, the lifter drops away from the valve stem as soon as the valve seats, and continued movement of the shaft raises the lifter nearly to the stem, where it remains until the next arrival of the cam. I have found no cams or lifters worn more than to a good polish, except the lifter, where it strikes the valve stem. In adjusting the valves, turn down the seat or draw out the stem, or both, until they are long enough, then file off the stem just enough to allow it to seat, and the engine will be as quiet as can be expected and will be correctly timed. I once dissembled a Franklin engine, the owner of which declared he had used it for 2 years and that it had never been cleaned. There was not enough carbon in it to cover a dime, although oil smoke issued from the muffler. Was it due to air-cooling or the auxiliary exhaust port, or both?—Guy B. Carroll.

BATTERY FOR HEADLIGHT

Racine, Wis.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House, advise me if it would be possible to use a 6-volt 60-ampere storage ignition battery to furnish light in place of gas for headlights on my car, and if such lights have the power of gaslights? If it is not good practice to use such a battery, can Motor Age give me the address of some company which manufactures a battery that is satisfactory? I understand that the fire chief of Milwaukee has been using a 6-volt 60-ampere battery and that it has given good satisfaction; also that there are a great many cars in Chicago equipped in this way. I would be pleased to hear from readers of Motor Age who have had experience along this line.—E. L. Bretnor.

It is possible to transform your acetylene gas headlights into electric headlights, but it is best to have this work done by some concern manufacturing batteries specially made for lighting purposes. You can use a 6-volt 60-ampere battery, but it is better to use a 6-volt 80-ampere one, such as the Vesta Accumulator Co., Chicago, and several of the other battery makers manufacture. In making the change from acetylene to electric light, the 6¼-candlepower electric bulb should be placed horizontally instead of vertically. The bulb is also located fairly close to the mirror reflector of the light. Generally, the acetylene flame, located at the focus of the mirror is from 3 to 3½ inches distant, but with the electric bulb placed at this distance not more than one-half of the produced light would be reflected straight ahead. It is possible to place the electric bulb much closer

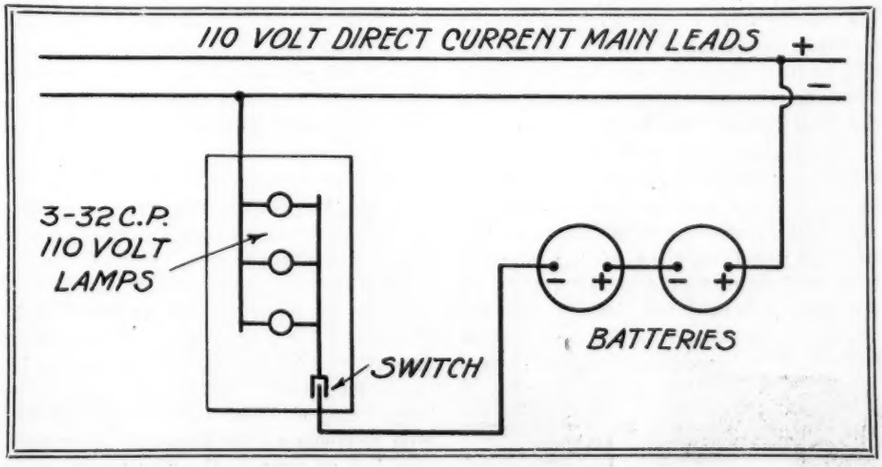


DIAGRAM ILLUSTRATING METHOD OF CHARGING BATTERIES

without danger of cracking the silver plating of the metal reflector. A 6¼-candlepower Tungsten electric light, working on a 6-volt circuit, will furnish two headlights 35 hours. Motor Age would like experiences of its readers on the use of electric headlights.

EFFECT OF GAS UPON TIRES

New York—Editor Motor Age—There is much discussion at present as to the effect of tire inflating gas on rubber tires, and the results of investigation made by numerous tire makers show that injurious results do not follow. In speaking of this recently, a well-known tire maker said: "Carbon dioxide is absolutely not injurious to rubber, and in that respect is slightly superior to ordinary air, which, in the absence of direct light, oxidizes rubber very, very slowly. For inflating purposes air is entirely satisfactory, since its rate of oxidation is so low as to be practically negligible except in the presence of direct light. Obviously the latter condition is not to be feared from any inflating medium. Carbon dioxide appears to be open to the objection that it diffuses more rapidly through rubber than air, and for that reason tires inflated with carbon dioxide must be inflated more frequently. We would not anticipate any difficulty whatever in satisfactorily carrying either air or carbon dioxide in pressure tanks and we certainly would not expect a formation of any nitric oxide or anything else which would injure either the rubber or the valves."—T. J. Fay.

ALTERING ORIENT BUCKBOARD

Terryville, Conn.—Editor Motor Age—I have a model O. G. Waltham delivery car with 89-inch wheelbase. The seat is just a little back of the front axle, and the steering is by lever. I use this car as an order wagon, but also take pleasure drives. It is my intention to put the seat back from 1 to 2 feet and substitute a steering wheel, as I am of the opinion it will ride easier, carry more load, and steer much easier. Am I right? 1—Will it ride better? 2—Will it carry more load or handle the same load much easier by placing a larger portion of the weight on the driving wheels instead of the driven? 3—Will it steer easier taking some of the weight from the front wheels? 4—Will it steer easier with steering wheel than with the lever?—F. P. Tolles.

The changing of the seat on your Waltham delivery wagon from immediately back of the axle to a point 2 feet in rear of this and the substitution of the steering wheel in place of the steering lever will improve the riding quality of the car, when used for pleasure purposes only, because the passengers will then be sitting midway between the axles, which is the point of least vibration. It is difficult to see how you can carry more load with the seat in the center of the car, because load-carrying space will be considerably reduced by bringing the seat back. Locating the seat in this position should considerably increase the tractive power of the vehicle by placing more weight on the driving wheels, and it should carry an equal load easier because of this change. The steering should be slightly improved because of removing some of the weight, although, if there is too little weight over the front wheels, there is danger of their not holding the road on turns, but, instead, being pushed straight ahead in the original line of movement by the driving wheels. It will be easier to handle the car with a lever than with the wheel because of the quicker movement possible, but using a wheel will form a support for the driver's hand which is of importance.

ON IGNITION TIMING

Thomaston, Me.—Editor Motor Age—After reading the two articles in Motor Age on a criticism of valve timing, I do not get a clear conception on what possible changes I could adopt to make a car pull stronger on slow speed. I mean by this, of course, not changing the faces of the cams, simply by the meshing of the half-time gears. Would not a few remarks on this side of the subject be of interest to many readers? I have a car that has more speed than I care for on these roads, and I have been considering the purchase of a set of lower ratio final drive gears, but if it would be possible to set the valves to get more power at low speeds, it might be as well and cheaper. What influence might the change have on fuel consumption?—K. A.

LENGTHENING WHEELBASE

Lowell, Mass.—Editor Motor Age—I have a two-cycle car, with 5-inch bore and 6-inch stroke, and 84-inch wheelbase. It is my intention to lengthen the wheelbase to 102 inches, and, as a matter of improvement in appearance, carry the radiator over the front axle sufficiently high to clear the axle at its highest point when encountering rough roads. The engine has good power and is in good condition after running over 11,000 miles. Will Motor Age advise me whether there are objections to these changes?—Arthur D. Colby.

It is quite possible to make the change in wheelbase, as you suggest, and it should improve the appearance of your car as well as greatly benefit its riding qualities. Instead of carrying the radiator high above the front axle, locate it lower and immediately in the rear of the axle, as is done on many high-priced cars. In lengthening the wheelbase, do not cut the side members of the frame at their centers but as near to the rear as can consistently be done, and use long re-enforcing pieces which fit closely within the side members of the channel frame and are riveted thereto. The reason for not splicing the frame side pieces in the center is that this is the point of greatest strain, and the splice should be placed at the point of least strain.

FEW STEAM CAR MAKERS

Lamar, Neb.—Editor Motor Age—As a reader of Motor Age I am very much interested in steam motor vehicles, but have noticed that only one manufacturer of a steam car and one of steam parts appear in the advertising columns of Motor Age. Why is this? Is the steam vehicle so much inferior to the gasoline machine as the comparative number of advertisements would indicate? I have never ridden nor do I own a car, but need one, and after consideration I have formed the idea that a steam vehicle can be made more simple, with fewer parts, less liable to get out of order, and lighter than a gasoline vehicle. Am I right or wrong? Will a specified amount of gasoline produce more usable power when used in a gasoline engine, or when used to generate steam for a steam engine? Do gasoline cars use gasoline in proportion to their weight; that is, would a car weighing 2,000 pounds consume four times as much fuel in running a specified distance as a car weighing 500 pounds?—Sanford E.

The reason there are so few makers of steam cars is that the White company practically controls patents on the automatic system of generator regulation and steam production, this company having several basic patents on the semi-flash generator. There are, however, one or two eastern makers, notably, the Stanley company, who do not use a generator of this nature. The relatively small number of steam makers is also due to the fact that European makers took up the gasoline engine and every maker felt he had to align himself with these forces if he is to be a successful motor car manufacturer. A steam vehicle can be made with very few parts. In ordinary road usage more distance will be obtained in a gasoline car from a gallon of gasoline than in a steam car. Gasoline cars do not use gasoline directly in proportion to weight, some 2,000-pound cars using nearly twice as much as another car of the same weight. The amount of fuel consumed is largely determined by the design and construction of the motor, as well as the efficiency of the carbureter. Much, also, depends on the driver, one driver using a third more gasoline than another in covering the same course with the same force.

Motor Car Shop Kinks

RE-HEATING THE COLD AIR

NOW that winter is at hand many owners find their cars do not develop satisfactory power until they have run 30 minutes or 1 hour. This, of course, is due to the gasoline and the air being so cold that the former does not have time to evaporate before entering the engine. Under this condition an increase in the gasoline feed is a necessity, though substantially all the increase is wasted so far as fuel economy is concerned. Even jacketed carbureters are not exempt from this trouble, and unjacketed carbureters may waste their own value in gasoline in 2 or 3 months. Under these circumstances, one has his choice of two expedients. If the carbureter is jacketed he may, by enlarging the pipes leading to and from the jacket, increase the flow of hot water or exhaust gases sufficiently to maintain the desired temperature in the mixing chamber. If this is done it may be desirable to enlarge the holes in the jacket wall itself, perhaps by drilling out and tapping for pipe nipples if the enlargement cannot be otherwise accomplished. This is better than screwing the pipes directly into the jacket walls, because unions may be screwed to the nipples and the pipes thereby disconnected when necessary. If the heat is derived from exhaust gas, the gas outlet from the carbureter jacket should be made adjustable at will, so that the carbureter will not be overheated in warm weather. A pet cock supplementing a minimum fixed outlet will serve this purpose, but it should be taken apart and thoroughly greased with vaseline and graphite, otherwise it may stick fast from the corrosive action of the exhaust gases. If hot water circulation is used, an ordinary shut-off valve of sufficient size in the water circulating pipe, will enable the carbureter temperature to be regulated.

If the carbureter is not jacketed, a heater connection must be run to the exhaust manifold. Many engines are provided with totally inadequate heaters. The illustration shows a heater applied to an exhaust manifold in place of one about half as long. The front end F is closed and has a small opening B underneath which may be calculated by an adjustable slide A. The back end C is open and receives the greater part of the air. It will be remembered that the front end D of the manifold is heated only by the gases from one cylinder, whereas the back end E is heated by three or four. Care is taken to make the cross-section of the heater sufficient to prevent the slightest throttling of the air, and the pipe P leading downward from it is slightly funnel-shaped to ease the corner which must be turned by the air stream.

Aids for the Amateur

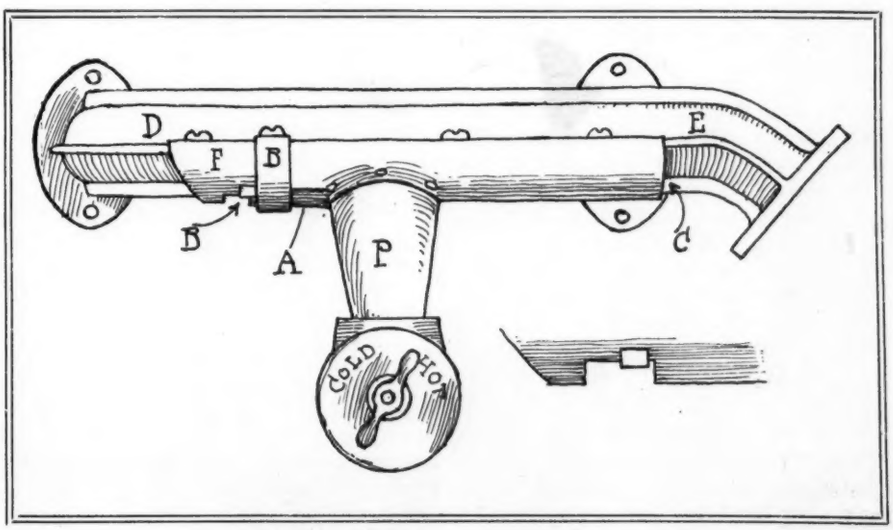
The engine for which the heater just described was made had an adjustable cold air inlet just below the heater, which could be opened to the full diameter of the intake pipe, thereby preventing overheating in warm weather. If such an arrangement is not already provided, a substitute may be made of a sufficiently large opening in the intake pipe between the heater and the carbureter, covered by an adjustable slide. This slide may be made in the form of an annular shutter, with an opening which, according to the position of the shutter, registers or not with the opening in the pipe. The shutter can be split opposite the opening and sprung over the pipe, and if an inch or so wider than the opening it does not have to fit the pipe very accurately. An engine fitted with a heater suited to its carbureter should warm up to its work as soon as the raidiator attains its running temperature, or within 10 or 15 minutes at the most.

EXAMINING LOOSE BEARINGS

When the engine knocks and the main or crankpin bearings are suspected, an easy way to test the former without opening the crankcase, is to put a jack under the flywheel or under the front end of the crankshaft, where the latter is exposed. A very gentle up and down movement of the jack lever will show whether or not there is any play in either the front or rear bearings. By taking down the bottom half or oil pan of the crankcase, the shaft may be turned with the cranks horizontal and the jack applied to the cranks close to the bearings. This permits the intermediate bearing or bearings to be tested. Rocking the flywheel slightly with the cranks in this position will show whether the crankpin bearings are loose. Frequently a noise which sounds as if it were in these bearings proves in reality to be due simply to end play of the large ends of the connecting rods of the crankpins. End play of this kind is not objectionable provided the crankpin and wristpin are truly parallel and the connecting rod ends are not offset from each other, as is sometimes done. Any of these things, however, will cause the explosive forces to drive the large end of the rod toward the front or back end of the pin. Obviously this action is accompanied by unequal wear of the two ends of the crankpin bearing.

SATISFACTORY GAS PIPING

The ordinary small copper tubing used to pipe generators is very unsatisfactory. It clogs rather quickly, and it easily cracks from vibration. Its worst fault, however, is that it is not stiff enough to keep its shape, and therefore, even if installed in such a manner as to drain condensed moisture toward one end or the other, it quickly acquires a series of undulations, each of which affords a miniature pocket for water. The result is that the lamps flicker and even go out entirely on the first cool evening, and the generator is blamed for their failure to burn. The proper tubing is ⅛-inch brass pipe, which can be arranged to slope continuously toward one or the other end, and provided with a drip outlet at its lowest point. In addition, a rubber gas bag should be interposed between each lamp and the pipe feeding it, so that any possible fluctuations of the pressure in the pipe will be equalized by the pressure in the gas bag.



INTAKE AIR HEATER ON AN EXHAUST MANIFOLD

HORSEPOWER AND REGULATION OF RACING

By Andrew L. Riker
President Mechanical Branch A. L. A. M.

EVERY owner of a car should have a clear conception of what a horsepower is. The term is a relic of the time of James Watt, who invented the first practical type of steam engine. He wanted a term that would define power or rate of doing work, that is to say, work divided by time. He made experiments and found that a powerful dray-horse could do all day long work equivalent to 33,000 pounds raised 1 foot per minute.

The action of heat engines, despite the complexity of the phenomena that confuse the finer points of their operation, is subject in a general way to a few important and invariable laws, requiring definition before discussion, so widely are they misunderstood. A motor car engine, like other internal-combustion motors, is essentially a heat engine, deriving its power solely from the heat units released in the combustion of the fuel and applied to the expansion of a volume of gases. Theoretically, the power thus available is determined by the kind and quantity of fuel used, independently of all consideration of mixture proportions, as long as ignition is effected and there is at least enough air present to complete combustion. Practically the power applied to useful work must bear some relation to that theoretically available; this relation is the measure of engine efficiency.

Uniformity in Design

It is useless to expect that any large body of designers will ever be thoroughly in accord on any subject involving so many opportunities for detail differences as motor design; though years of experience have resulted in evolving a type of construction followed so closely in such a large number of instances as to warrant being termed current practice in this respect.

Among gas engine designers the aim has been to secure as high a mean effective pressure in the cylinder as possible. The mean effective pressure in a gas engine cylinder may be affected by causes which result in failure to secure proper results from the charge that is taken into the cylinder. The size, timing and location of the valves, the character of the inlet and exhaust passages, the effect of heat on the incoming charge, improper speed of engine and parts, affect the size of the charge entering the cylinder. Leaks, character of mixture, time of ignition, timing of valves, compression pressure, etc., affect the results to be secured from the charge after it has entered the cylinder.

Cut-and-Try and Empiricism

Up to a comparatively recent time, a greater part of the designing of motor car engines has been done on the cut-and-try method; as the formulae laid down by such men as Kent, Union and Thurston were of but little use, and the formulae that could be used had to have a new constant, which varied as greatly as the opinions of the designers. Many times there could be found no formulae that would fit the conditions and the designers had to figure them out themselves. The vast improvements in metallurgy have given us grades of material which also have rendered obsolete many formulae.

Empirical formulae have, however, at great expense and labor, been brought to a standard, so that the designer of the present day has many tangible facts on which to base his work. In this sense motor car engines conforming to American practice can be built without using cut-and-try methods, except in points of detail. To make the bore and stroke equal approximately has been considered the best practice for ordinary purposes. The compression is also pretty generally agreed upon as being right at 70-75 pounds gauge, or 84-90 pounds absolute pressure.

Status of Knowledge

Competent designers know accurately what power, at the least, a good gasoline motor of a given size should develop. The required size, weight, running qualities and life of the motor are also pretty well understood. That is, it is clear within relatively narrow lines, what type of motor it is reasonable to put in a car to be used by the public, and also what a fair and conservative rating for a given size motor at a given piston speed is.

Fairness in Motor Rating

It is obvious that if such a rating is known, it should be applied and used, to give light to the public as between motors rated high, as offering big value, and those rated modestly, as showing superior performance over nominally higher-powered cars. It is common sense that superiority is best shown by excelling performance of one motor of a given size over another motor of the same size, but rated the same. At any rate, in this way is indicated the ability of one designer to accomplish a better result on the same basis. We do not know how much power a motor of a given size may in the future be made to produce. Therein lie the competition and hard work of the designers.

There is obviously only one accurate way of determining the effective horsepower of any particular engine, and that is to try it on the brake. For the purpose of a general rating formula, an approximation, the only thing possible as well as *sine qua non*, will suffice. Owing to the many variable detail factors which affect the power developed by any engine, the whole subject is complex, and necessarily somewhat vague, and in one way, as evidenced by the views of people of varying experience, experts, et al., controversy thereon is interminable.

A. L. A. M. Formula

The A. L. A. M. horsepower formula was adopted after much consideration by, and the almost unanimous opinion of, the association engineers. And I have been continually gratified by its adoption. Various bases for a standard rating were considered. Finally a formal vote of all the engineers was taken on the question of what is a fair, conservative rating for a given size four-cycle single-acting motor at a given piston speed. One thousand feet per minute had previously been agreed upon as a proper piston speed to assume. The average view was so nearly in accord with the results the formula theretofore adopted by the Royal Automobile Club of England—the diameter of the piston squared, multiplied by the number of cylinders, divided by the constant two and one-half, equals horsepower—that it was decided to adopt this formula; conforming to an existing standard, so avoiding further confusion in a subject it was sought to clarify. Superficial critics of this formula at times fail to bear in mind that the application of the formula recommended by the Association of Licensed Automobile Manufacturers, is based on 1,000 feet per minute piston speed. Neither ought it to be necessary to point out that a motor developing on the block, 33 per cent more than the required power by the formula, is no occasion for surprise; it is looked for.

Contest Ratings

The A. L. A. M. horsepower formula was not intended primarily to be used in racing, but there is no reason why it, or an analogous principle, cannot be used equally well as a basis of contests of any character. We see in the recent "4-inch" race in England, in the decision to limit only the engine bore of cars entered in international racing, and in specially constructed single-cylinder racing cars abroad, a marked encouragement of cars which would never be built for touring purposes only. The obvious sensible way of limiting the power of a racing motor is to limit the cylinder volume and not the bore or the stroke alone. The limitation of the engine bore under the grand

prix rules is very wise, but the stroke also should have been limited, for engine strokes of freakish length are the inevitable result. The amount of compression pressure should also come in for consideration.

Foreign Rules for 1908 and 1909

All racing cars built abroad for the season of 1908, by virture of an international ruling, were restricted in design as to their cylinder bore. For the grand prix and other events, intended for large cars, the bore was 6.1 inches; for the English Isle of Man contest, the limitation was 4 inches—thus the name, "4-inch race." Similarly the bore of the cars constructed for the small car race run on the day preceding the grand prix were restricted. In spite of these limitations the cars were speedy and notably high averages were made. In fact, the average time made by the winner of the Florio cup is a new record, faster work than has even been accomplished before with a motor of unlimited bore and stroke. The French grand prix was won at an average of 69.2 miles per hour; the voiturette race the day before the grand prix at an average of 50.02 miles per hour.

Abnormal Strokes

At first thought it would appear that the tendency to limit the size of racing motors in this manner is admirable, but when a study is made of the strokes of the foreign racing cars of 1908, it would appear that many of the motors are in reality freaks, particularly when it is considered that the short stroke motor is gaining ground all the time and that a few years ago, when the bore was unlimited, the foreign designers made the stroke short in preference.

For 1909 the Europeans have decided to reduce the bore still further, from 6.1 inches to 5.1 inches. It was hoped that some limit would be placed on the stroke because the Automobile Club of America, in reply to the request of the racing powers abroad, advised a classification by volume, a most sensible thing. The wisdom of this plan should be obvious to all; it not only places four and six-cylinder motors in the same class, but it encourages rational motor design and the building of cars that will have a commercial value after the races are over. A four-cylinder motor of 5.1-inch bore and a reasonable stroke, say 6 inches, is a very good size. A manufacturer could easily turn such a racing car into a stylish and speedy roadster with little trouble; the result would be a car containing all the value racing can offer in the way of experience, and instead of a freak, would be a new logical model, perfectly tested. Just what a 5.1-inch motor with an extravagantly long stroke would be good for after the racing season, with the rules changing every year, is difficult to see. The foreigners can very well afford to build such cars owing to the large number of events held abroad every season, and therefore open to just such specially-built racing cars. Moreover, motor car advertising on the continent is largely limited to contests, wherefore the makers can afford to go to greater contest expense. They do not have as many motor car shows as we have; do not have to do so much advertising in the newspapers and magazines, and, what is very important, the advertising they do is highly effective, owing to the relatively small and densely populated areas as compared with the United States.

The point might be made that a few of the racers built abroad for the 1908 season did not have abnormally long strokes. It is reported that the winner of the French grand prix had cylinders of 6.09-inch bore and of 6.69-inch stroke. But it must be considered that a 6.1-inch bore is large, a real racing dimension in itself, and in this case it was not found necessary to lengthen the stroke very much.

Now, for 1909 the bore is greatly reduced, and in order to make a fast car, the designer is almost certain to build a very long stroke motor, like in the cars in the 4-inch race in England, or the voiturette race in France.

America Anxious to Compete

What today is the position of the American manufacturer who has a desire to build a car that can win the French grand prix of 1909? Simply this: He must build, for racing purposes only, one or more freak cars. He cannot compete successfully with the foreigners unless he does. If he does not lengthen the motor stroke to some absurd length, his cars will not have the speed of the foreign cars; he will not be racing on equal terms with them, and will be beaten.

What then will be the attitude of the motor car public toward American manufacturers who are in sympathy with and experienced in racing, but who do not care to build freaks, from the racing performance of which they will learn little or nothing? Most likely it will be considered that they are "dead slow" or unpatriotic or afraid of the foreigners. Not in the least. The American builder has had nothing to do with the formation of the 1909 racing rule beyond an unheeded protest made by him through the medium of the A. C. A.

Is it too late to gain a reversal of the rule? If the cylinder volume instead of the bore only could be limited, it is certain that a large number of splendid, fast American racers would be built and their performance prove the mettle of the American designer in a more impressive and conclusive manner than ever before.

The present situation is more than unsatisfactory, but if it can be explained and thoroughly understood, that much at least will have been accomplished.

Souther on Tire Slippage

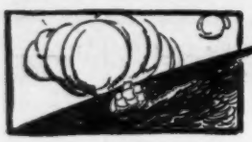
Henry Souther, M. E., technical expert of the mechanical branch of the Association of Licensed Automobile Manufacturers, after studying the results of the recent tire-slipping tests in England, analyzed the figures showing the results of tests published in the trade press. These tests give the number of revolutions of each wheel on a motor car running over a measured course. A high-powered car, a Napier, was used on the Brooklands track in England. A newly developed instrument made it possible to accurately record the number of revolutions of each of the wheels independently and for identically the same period of time. The chief result determined was that the revolutions of the rear wheels were greater than the revolutions of the front wheels. That is, the driving-wheels would slip. Not content with the mere fact that they slipped, and that the slippage was greater with greater speed, Mr. Souther has prepared from the data obtained in those tests a curve, which shows graphically what may be assumed as a fair average.

While the results as published simply indicate the number of revolutions that the rear wheels exceed the front wheels in the particular tests and with that particular machine, the data does not give the size of the wheels or the size of the tires or the length of the course. Without consideration of the other details that are involved, the results obtained by Mr. Souther's analyses indicate the percentage of tire slip. Mr. Souther says:

"From these results, we have now added to our knowledge of motor car operation, the fact that on a level racing track of the best sort, with plain round tires inflated as is usual for racing, the percentage of slip of the rear wheels when driving is about:

0.3 for a speed of 40 miles per hour
0.6 for a speed of 50 miles per hour
1.1 for a speed of 60 miles per hour
1.8 for a speed of 70 miles per hour
3.7 for a speed of 80 miles per hour
5.4 for a speed of 90 miles per hour

"In addition, it appears that the driving-wheel on the inside, running around a curved track, slips a very little more than the outer wheel. This is clearly accounted for by the fact that the centrifugal force going around curves reduces the weight on the inner wheel permitting it to slip more readily than the outer wheel. It is to be hoped that more results and more accurate data from different kinds of tires and on different kinds of machines, may soon be obtained."



From the Four Winds

N S E W

Will Race On Ice—Motor car racing on the ice will be in vogue at Monroe, Mich., this winter, an organization for that sport being planned by enthusiasts of that place. The races will be run on the Raisin river and on Lake Erie.

Michigan's Prize Road—What is known as Rochester's prize road has been completed and represents the banner 2 miles of highway in Oakland county, Michigan. It cost $1,000 per mile. Two and one-half miles of new roads has been constructed at Stanton, Mich., and this stretch is declared by State Highway Commissioner Earle to be the best 2½ miles of road in the state of Michigan.

Dealers Must Register—"No favors will be shown," is the gist of a letter mailed out last week by Chief Robert Metzger, of the Indianapolis police to the motor car dealers and manufacturers and garage owners of that city. The letter was a warning that state registration numbers must be displayed on cars, the first time, by the way, that an effort has ever been made to enforce the Indiana registration law. Last week about twenty-five arrests were made of drivers of cars not displaying the numbers and each driver was fined $1 and costs amounting to $11.

Cars for School Superintendents—C. H. Hemenway, county superintendent of schools of Rock county, Wis., advocated the purchase by each county in the state of a touring car for the use of superintendents, in a strong address before the Wisconsin State Teachers' Association convention in Milwaukee last week. "The county superintendent has been the official packhorse and dray cart long enough," he said. "It is time that he be provided with an up-to-date means of locomotion. There is nothing like a motor car for this use. Many trades and professions where their need is not nearly so imperative as ours has the advantage, and we demand it also."

Sheriff Has Radical Views—Sheriff W. R. Knell, of Milwaukee county, Wis., has come out in a red hot interview in which he assails the owner and chauffeur. His talk has caused no little indignation among Milwaukee people, especially members of the Milwaukee Automobile Club, who feel they are being treated unfairly. "Until it is made a misdemeanor to possess a car not provided with some device to indicate its speed as it runs, the city and state laws regarding motor cars will never be satisfactorily enforced," said Mr. Knell. "Another thing: So long as a fine of $10 or even $15 or even $25 is all that is imposed on these lawbreakers, it will not deter them. Cars are ordinarily owned by men who are wealthy. What difference if they pay a fine of $10 a month? It means an addition of only a paltry $120 annually to the cost of a $6,000 machine. The first penalty should be $100, the second $200, and the third a lengthy imprisonment in the workhouse."

Coroner's Statistics Favorable—According to statistics given out by the coroner's office at Detroit at the end of the fiscal year recently only five persons were killed as the result of motor car accidents during the past 12 months, which is one fewer than the number of fatal accidents occurring through the use of horse-drawn vehicles. There are doubtless more motor cars driven on the streets of Detroit than any other city in the country, due to the large number of factory testers continually at work.

Picks Flaws in Road—At a recent meeting of the new Civic Club of Rochester, N. Y., the new Charlotte boulevard there was characterized by Senator Armstrong, one of the speakers, as a poor piece of work. His remarks, which have aroused much comment among the motorists of Rochester, included the following statement: "This boulevard, crowned so high that it is impossible to drive on it any place except in the center, is a disgrace. It is already in ruts and I prophecy that before spring it will need resurfacing."

Drake Made President—Clarke S. Drake, secretary and treasurer of the Badger Chemical Mfg. Co., Milwaukee, was elected president of the Milwaukee Automobile Club at the annual meeting of the board of directors. William L. Hibbard, president of the W. L. Hibbard Motor Car Co., was elected first vice-president, and F. Prinz, a member of the Prinz & Rau Tannery Co., second vice-president. James T. Drought, secretary for many years, was re-elected. No decision has been reached by the club on the matter of building a clubhouse, but the committee made a favorable report.

Minneapolis' Program—A decided impetus to things social in Minneapolis has been given lately by the appointment of an entertainment committee by the Minneapolis Automobile Club. Colonel F. M. Joyce, president of the Minnesota State Automobile Association, is chairman of the committee and has gathered around him as members of the committee men who do things so that it looks as if the social side of the club life this winter will be very attractive. There will be open house at the club's headquarters all day Thanksgiving day. In addition to these pleasant housewarmings on the various holidays, the committee has planned for a series of moving picture exhibitions showing the big races of the year and there will be lectures by recognized experts on various things pertaining to the construction and the operation of motor cars. There may also be sparring and wrestling exhibitions for members only later on in the winter.

Scorcher Heavily Fined—Justice Chadsey of Rochester, N. Y., recently imposed on a motorist the largest fine ever given in that city for a violation of the speed law. The judge fined the defendant $100 or 100 days in jail, the maximum penalty for a first offense. The motorist admitted that he was going nearly 37 miles an hour in a crowded street. In imposing the fine the court said: "A man who will go that fast on a crowded street is reckless beyond description."

Progressive Ohio Farmers—That Ohio farming districts are taking a keen interest in the progressive idea of better highways is shown on all sides. The latest evidence of this interest comes from Jackson township, Seneca county, O., a rich agricultural district where a special election will be held on December 29 to determine the question of issuing bonds in the sum of $75,000 for the purpose of improving the township roads. The action was taken by the taxpayers and is said to have a strong public sentiment behind it, which is almost certain to bring success. There is much of this same progressive spirit cropping out all over Ohio at present, and it would not be surprising to see rapid strides made in the matter of road building the coming year.

Hughes After Road Expert—Chairman William E. McClintock, of the Chelsea board of control, who recently resigned as chairman of the Massachusetts highway commission to take the former position, was asked by Governor Hughes, of New York, to visit Albany a few days ago for a conference relating to a position. Mr. McClintock admitted that he had been to Albany and had talked with Governor Hughes, but he refused to go into the matter. However, from another source it was learned that Mr. McClintock was offered a place on the new highway commission of New York, and that the term was to be 6 years with a salary of either $8,000 or $10,000 annually. This is not surprising, for it was under the direction of Mr. McClintock, who is a practical engineer, that Massachusetts has completed such a splendid system of highways. Two reasons figured in the refusal. One of them is that Mr. McClintock is very much interested in his native city, Chelsea, and wishes to see it rehabilitated since the devastating fire; and the other is, that as Chelsea is the only city in the east governed by the commission, Mr. McClintock

does not want to step down and out until the plan has proved either a success or a failure. He feels to leave it so soon after accepting the position would not be good policy. In doing this he is sacrificing as much more in salary as he gets now.

Endorses Great White Way—The Milwaukee Real Estate Association has endorsed the great white way project, following similar action by the Milwaukee Automobile Club and other organizations. The plan is to build an 85-foot boulevard from Chicago to Milwaukee at private expense. It will cost $2,000,000. It will be 100 miles long.

Country Home for Canadians—Motorists of Toronto, Ont., have acquired Lorne park, beautifully located on Lake Ontario between Toronto and Hamilton. A hotel on the property will be used for a time as a clubhouse. The park contains hundreds of acres of woodland. A new clubhouse will be built later. The number of members will be limited to 300. The new club will be formally opened by a banquet on May 24 next.

Against Toll Roads—The question of abolishing the toll roads that lead into Baltimore and those located elsewhere in the state is the chief matter being considered by the motor car commission and Governor Crothers. The chief executive hopes to see the commission deal with this matter in a way to soon do away with these private turnpikes and he believes this work will be accomplished before his term of office expires. He made it known, however, that the private turnpikes would not be purchased but he says that several propositions have been advanced by the owners to turn some of them over to the state. Most of the state roads will run parallel with the toll roads and this would relieve the people to a great extent from paying toll.

Inspects Franklin Plant—The Chamber of Commerce of Syracuse, N. Y., has inaugurated for its thousand members a series of trips of inspection to the homes of the city's greatest industries, and a start has been made by a visit to the plant of the H. H. Franklin Mfg. Co. The aim is to give to all who are largely engaged in the material upbuilding of the city a greater knowledge of what their fellow workers in other lines are doing and thus bring about a greater harmony of purpose and action and a greater combined result. The factory of the Franklin company was chosen for the first inspection for the reason that with its 1,500 employes it represents the city's greatest business enterprise, although its manufacture of motor cars dates back only 7 years and the first year's output was only thirteen machines. A large percentage of the members of the chamber made the trip to the factory, starting from the chamber's headquarters in motor cars and on the way parading through the principal streets. At the plant they were received by Mr. Franklin and other officers of the company, and in small groups, each with two guides, were escorted through the various departments and given a demonstration of the making of motor cars from the stage of the raw material to that of the finished product.

Denver Alters Plans—The contest committee of the Denver Motor Club has changed the finishing point on the course of the hill-climbing contest to be held December 12, so that the climb will be 1⅔ miles in length and grade ranging from 4 to 20 per cent, with a couple of easy turns. By this change both the start and the finish as well as the complete trip of each car may be observed by everybody. The first plan of the route had thirteen turns, a grade in some places of 20 per cent, and more than half the time the cars would be out of sight.

Wilkes-Barre Chauffeurs Organize—With the prospects of becoming one of the most flourishing organizations of its kind, the Chauffeurs' Club of Wilkes-Barre has been organized in Wilkes-Barre, Pa. The club starts out with a charter membership of fifty. The officers of the club are: President, George Kessler; vice-president, William Miller; secretary, Ralph Wolfe; treasurer, Archie Roberts; board of governors, Edward Brown, Joseph Doty and John Zorzi; membership committee, Isaac La France, John Cavanaugh and Harry Richards. In appreciation for his services in organizing the club, Arthur A. Casper was made honorary president.

May Change Dewar Rules—Vice-President Lewis R. Speare, of the A. A. A., stated a few days ago in Boston that there was a possibility of a change in the deed of the Sir Thomas Dewar trophy. At present it may be raced for only at a distance of 1 mile and it is a perpetual trophy. Mr. Spear said that Sir Thomas Dewar is not averse to having it raced for at some other distance, and there is a chance this may be done with the probability of the winner keeping it. The trophy is at present in the rooms of the Bay State A. A., at Boston, where it has been held ever since it was first won by Louis S. Ross, of Newton, and afterward defended by Fred Marriott.

Would Punish Car Thieves—The Milwaukee Automobile Club will ask the 1909 Wisconsin legislature, which convenes in January, to enact a law to make motor car stealing as grave an offense as horse stealing, which has always been a prison offense in Wisconsin. The numerous thefts of cars during the last 3 months in the city of Milwaukee, especially, have made this request more than advisable. A man who steals a horse may under a special enactment be given a maximum penalty of 15 years in state's prison, and the minimum penalty is 2 years. The club members figure that if it is worth 15 years, maximum, to steal a horse, it certainly is worth the same sentence for stealing a motor car, which on an average is worth two to three times as much as a valuable horse. At the present time the maximum penalty for stealing a car is 5 years' imprisonment.

Starts Dust Crusade—The Milwaukee common council's committee on streets will begin early in 1909 to take steps to moderate the dust nuisance. The Milwaukee Automobile Club has for a long time been trying to get action on this matter and has finally succeeded in convincing the board of public works that the moderation of the nuisance will be of more benefit to residents than motorists as a class, which was an argument against it. Experiments will be made with various oil and tar preparations when spring sets in.

After Car Thieves—The Denver Motor Club is going after motor car thieves. On November 7 a four-cylinder Stevens-Duryea was stolen from in front of the residence of George Tritch. In order to put some life in the search for the thieves the club has offered a reward of $100 for his apprehension. The club also is fastening to every member's car a plate on which is stamped the following warning: "Any person who molests this car in any way will be pursued regardless of expense by this club, and will be punished to the limit of the law."

Aiding Santa Claus—Owners of motor trucks in Indianapolis are offering to deliver free of charge all of the packages of toys and other gifts to be given to the unfortunate children of the city Christmas through the Santa Claus fund of the Indianapolis Star. There are about 1,200 packages, representing about 3,000 children, to be delivered on the afternoon of December 24. Heretofore the packages have been delivered in large horse-drawn moving vans, which has proved expensive and unsatisfactory. The following concerns have offered to donate the services of trucks and drivers: Indianapolis Motor Car Co., five; Morton Place garage; Knight & Jillson Co.; Shank Furniture and Storage Co. and the Premier Motor Mfg. Co.

Denver Show Date Changed—The Denver Motor Club has changed the date for holding the annual show to February 16, 17 and 18, which will be during the week following the Chicago show. The show will be under the direct management of the show committee, consisting of Ralph W. Smith, chairman; C. P. Allen, George E. Turner, Dr. E. F. Dean and Dr. W. H. Sharpley. The committee will mail application blanks and floor plans December 1, and applications already on file will take up the major portion of the 16,000 square feet of available space on the main floor, which will be reserved for the exhibit of complete motor cars. On the Curtis street side of the building there will be two elevated platforms, called the Terrace. These and the larger boxes will accommodate the motor cycle and accessory dealers' displays.

EXAMPLES OF AUTOGENOUS WELDING

FIG. 1—AUTOGENOUS WELDING APPARATUS

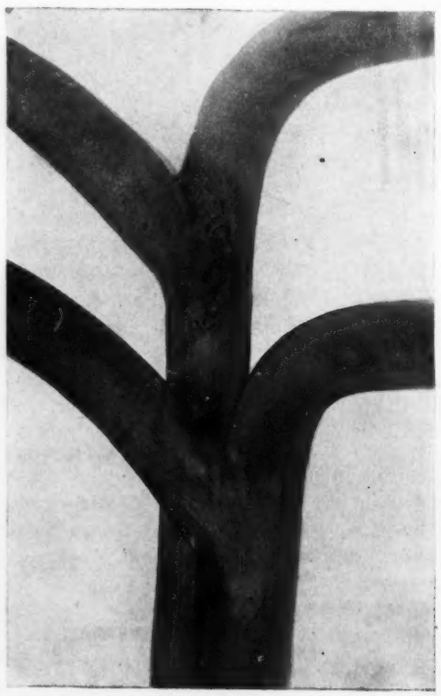
EDITOR'S NOTE—In this article Henry Cave, president of the Autogenous Welding Equipment Co., Springfield, Mass., gives many examples of how this kind of welding is done in motor car work.

AUTOGENOUS welding is the uniting of metals, by heat alone, without pressure—as is used by the ordinary blacksmith, and usually applied with a hammer, and without the use of a flux or another metal—as in brazing and soldering.

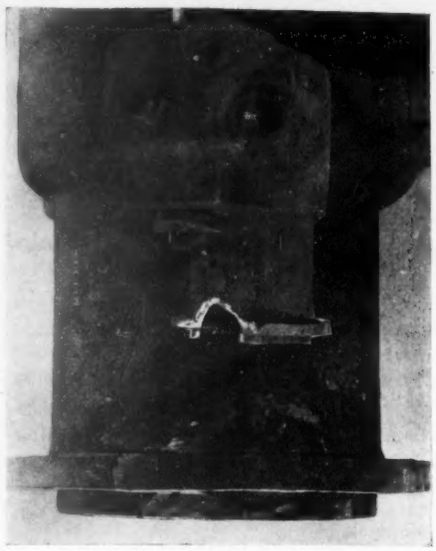
The most common apparatus for this purpose is one in which the heat is produced by burning acetylene with pure oxygen, in a hand torch giving a welding flame varying in size, from about $\frac{1}{16}$ to $\frac{1}{4}$ inch in diameter, depending on the size of the tip, a number of which are supplied with each torch, and used as required by the size and thickness of the part to be welded. This flame has a temperature of about 6,300 degrees Fahrenheit, which is about the same as that of the electric arc, and upon its application to any metal fusion very soon takes place, the extent of which is noted by the operator, who is guided accordingly in the movement of his torch. The metal at the point of fusion flows together and is practically "recast locally," metal being added where necessary from a rod of the same material as the part being welded. This applies to all metals, including cast iron and aluminum. These two metals are mentioned particularly, because they are not commonly considered to be weldable, and, therefore, serve the better to show the magnitude of this development, particularly when it is considered how brittle they are, and how subject to mishap.

Like the motor car, autogenous welding owes its early development to France. At the end of last year there were over 800 plants in operation in that country. The whole secret of the process lies in the high temperature of the flame, which raises the temperature of the metal so rapidly that very little heat is diffused into the body of the part. Most of it, therefore, being available for fusion. The number of heat units actually absorbed by the metal is a very small fraction of that required to bring the same part to a brazing heat, with the ordinary gas or oil blowpipe and very little, if any, warping takes place. One of the first points to be understood, when considering autogenous welding of any part, is, that the flame has actually to come in contact with every drop of metal welded; and that it is impossible to weld in places where this cannot be done. For instance; if a small boss is required on a casting, it is useless to cut out a disk of metal the size of the boss with the idea of welding it on. The correct way would be to add metal, drop by drop, until the required size is reached, and if the shape is of importance, extra metal must be added and machined off to the correct size.

Metal up to $\frac{1}{8}$ inch in thickness can be "butted," the heat passing down the opening being sufficient to insure its welding through. Above this thickness the sides must be beveled off, allowing the welding flame to penetrate to the bottom of the joint. The operator then notes the flow of the metal right from the bottom and fills up the groove accordingly. In welding a crack, in metal over $\frac{1}{8}$ inch in thickness, it is necessary to cut a groove, or opening, which will allow welding right through. These grooves will be noticed, in some of the illustrations. The grooving is usually done by grinding, but sometimes by clipping, filling, milling or sawing. When bevelling a broken part, care must be taken to leave sufficient of the original break to line up the parts with; it generally being desirable to leave three short sections on each fragment for this purpose.



FIGS. 2 AND 3—WELDED MANIFOLDS



FIGS. 4 AND 5—SAMPLE CYLINDER WELDS

It will be realized that it is impossible to make a lap weld, with this apparatus; therefore, when it is required to weld such parts, as are usually brazed, as, for example, the joints of the exhaust manifold made from steel tubing, shown in Figs. 2 and 3, it will be necessary only to fit the two tubes so as to butt together, and they should not be flanged, as for brazing. The flanges and other fittings will only be welded at the edge, either outside, inside or both, as found most convenient; it being only necessary to weld around at one place.

When a crack or break passes through a machined surface, as in the case of the cylinder, Figs. 4 and 5, which was broken through the failure of the connecting rod, and it is not necessary to eliminate all signs of the accident, it may be welded entirely from the outside. The machined surface will not then be damaged; but the line of the crack can always be seen on the inside. If it is necessary to eliminate all signs of the break, then the crack must be welded on the machined side as well, and metal added, which can be removed by hand or machine, as desired, the break then being indistinguishable. In some cases when the part is broken out entirely, the internal strain in the metal may cause the broken part to warp, and it will then have to be fitted, as near as possible, and metal added to make up for any defects.

It is sometimes impossible to get at both sides of a weld, as in the case of the two-cycle cylinder Figs. 6 and 7. The deflector on the piston having been driven through the wall of the compression chamber, it was necessary to weld this from the outside, so a piece was cut out of the jacket wall, as shown in Fig. 6, thus mak-

ing the inner wall accessible to the flame from the outside. A block of graphite, which stands the intense heat better than any other material, was fitted inside the cylinder. The weld was made on this, and then the hole in the jacket was filled in, as shown in Fig. 7. Upon removing the graphite, the inside of the surface was found to be free from any projections, that would cause pre-ignition. The outside, Fig. 7, could be trimmed off, so that it would look the same as before the accident. Aluminum crankcase can be readily welded with this process.

A party on tour, traveled over 100 miles by train to have a malleable iron hub, not illustrated herewith, made serviceable again, the work being carried out in a very short time. The damage to the two cylinders shown in Fig. 12, and repaired, as can be seen by Fig. 13, does not reflect any discredit on the designer, as it was an experimental car, the parts being made light for special reasons.

It will be seen from these illustrations, that autogenous welding can be extensively used, not only in the manufacture, but in the repair of cars, it being possible to save the owners large sums, or what is often more important, to get the cars back on the road in a minimum of time. In numerous cases, early makes of cars have to be abandoned, owing to the supply of spare parts running out. This process will put many of them back on the road, as it makes them, to a certain extent, independent of such conditions.

COMPARISON OF WEIGHTS

Considerable interest is expressed from time to time regarding the comparative weights of various conveyances, but until recently no figures that might be regarded as authorative have been compiled. A street railway and electrical journal, however, a short time ago, made an investigation of various models of electrically-driven passenger cars. Forty-six different cars were used as the basis for the compilation and most of them were found to weigh from 1,200 to 1,333 pounds a seat, the number of seats ranging from forty to seventy-one. The range in weights may be appreciated when the fact is shown that of two cars, each seating sixty, one weighed 854 pounds per passenger and the other 1,213. Little argument would be needed to show passengers which of the two would be safer for traveling, or a buying company which would prove more durable. The Pullman company goes still farther on the question of weights, its cars with a capacity for thirty people, weighing about 125,000 pounds or 4,166 pounds per passenger. With this weight, however, neither the Pullman car nor the electrically-driven car carries its own power plant. A motor car does. And in a comparison of the weights of Pullman cars, interurban and city electric cars, and the motor car may be found a striking commentary on the advance in construction in the latter. As an example, a Pierce-Arrow touring six-cylinder car and developing 48-horsepower, with the water, oil and gasoline tanks filled and equipped with a cape top and glass front weighs only 572 pounds per passenger. One of six-cylinders, developing 60-horsepower and with the tanks all filled and similarly equipped, weighs 639 pounds per passenger. Giving the interurban car without its own power plant and running on a carefully prepared track a fair average of 1,200 pounds per passenger and the motor car 600 it would give the Pierce-Arrow, with its power plant complete and fully equipped for any weather or work on any road, a weight of just one-half that of the interurban car per passenger and a little less than one-seventh that of the Pullman railroad car.

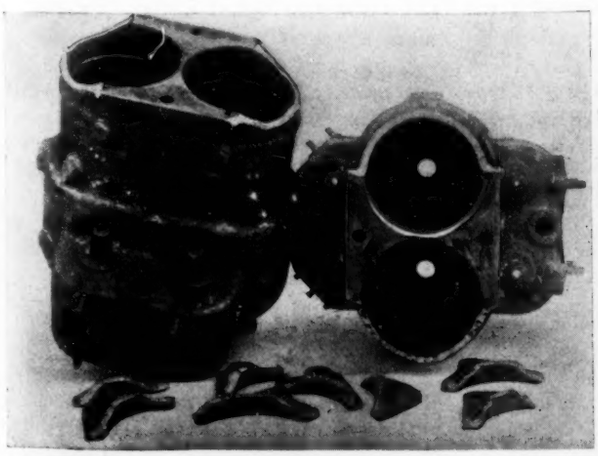
FIGS. 6 AND 7

MOTOR CAR LITERATURE

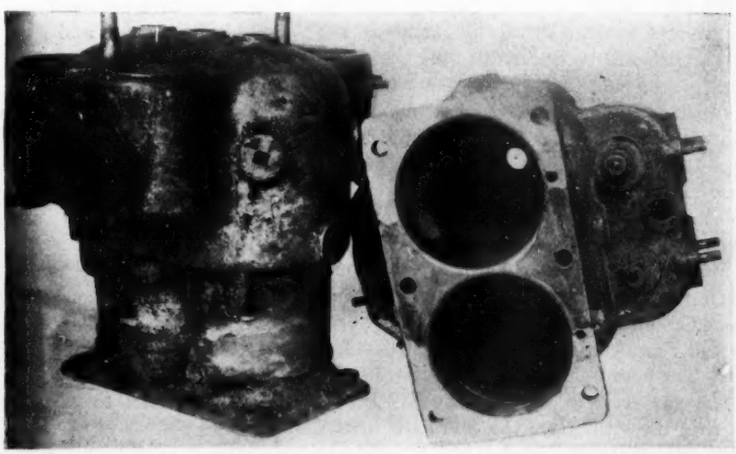
A new house organ, "The Weed," has been brought out, which is edited by Rowland, of New York. As one might suspect, it is issued by the Weed Chain Tire Grip Co. and the initial number tells of the work of the Weed as used by Mrs. Cuneo in the Glidden, in the New York-Paris race and in various pathfinding stunts throughout the country. There also is a chapter devoted to the well known Houdini-Weed match in which the strong man had a long tussel with the tire chains. The same company also has issued the "Life and Adventures of Houdini" which goes into the detail of the test.

The Winton company's Auto Era for November is made up of "Outline Facts of Lubrication," "The Fallacy of Light Weight," "Funny Side of Motor Car Progress," "Philadelphia Sees First American Car," "Touring and Camping in Oregon," "'Justice' or Highway Robbery," and "Good-bye to Tire Pump."

White steam ambulances, patrol wagons and buses have a special booklet devoted to them by their maker, the White Co., which describes and illustrates some of the rigs which are being used by Uncle Sam and others, which are in the service of several big municipalities. Letters of commendation from city and hospital authorities are published and the editor tells of his experience during a night passed on the White ambulance at Newark, N. J.



BROKEN CYLINDER CASTINGS



CASTINGS AFTER WELDING

FIGS. 12 AND 13

HEAT TREATMENT OF STEEL FOR MOTOR CARS

EDITOR'S NOTE—In the following article Thomas J. Fay, president of the Society of Automobile Engineers, discusses the improvements in motor car construction wrought by heat-treating steel. The article will be continued.

METALLIC salts are superior to metals for the heat baths in heat-treating work because higher temperatures are possible on the one hand, and lower initial temperatures are possible on the other. It is one of the objects in heat-treatment work, to be able to raise the temperature of the parts slowly, from a low temperature to the ultimate temperature. This would not be possible in a metallic bath because the heat of the bath cannot be less than the temperature of the melting point of the metal. The use of metals with a low melting point would not serve the purpose because with metals it is not feasible to keep on increasing the temperature to any extent above the melting point of the metal.

Metallic salts, on the other hand, can be controlled within very wide limits, as for illustration, if it is desired to attain a maximum temperature of 1,000° C. from a very low initial temperature, it is only necessary to provide the metallic salts as follows:

1,000° C. METALLIC SALTS HEAT BATH

		Per Cent
NaOH	Sodium hydrate	8
NaCl	Sodium chloride	91
KNO	Potassium nitrate	0.5
K_2CrO_4	Potassium chromate	0.5

Up to 1,000° C. this bath will not vaporize, hence it is available for use in heat-treating work for the purpose of heating steel previous to quenching, for any temperature up to the maximum, as stated. If, on the other hand, a higher temperature than 1,000° C. is desired, then it is necessary to use:

Pure Crystalline Chloride of Barium

The melting point of this material is about 950° C., hence in using it the materials must first be heated in a bath of such metallic salts as will melt at a lower temperature, if it is a fact that suddenly heating the steel at such a high point will effect the results adversely. The chloride of barium salts will allow of a temperature of 1,350° C., hence a bath of this material will serve for the most difficult work to be undertaken.

If chloride of barium and chloride of potassium are mixed in the ratio of 3:2 the result will be a metallic salt bath that will give good results up to 950° C., with a melting point 670° C., but as before stated, if the belting point is to be lower, the 1,000° C. bath is the proper one to use. By varying the proportions of the salts it is possible to fix a variety of temperatures both initial and final. The advantages of the salt bath are obvious, since the immersed steel takes on the temperature of the bath and the steel is protected from contact with all else besides.

It has been found that the salts do not affect the steel in any way and in transferring the steel from the salt bath to the quenching bath the steel is protected from atmospheric contact, so that the steel remains clean and free from surface oxidation. This question has received much attention at the hands of Dr George W. Sargent, Metallurgist in Chief of the Carpenter Steel Co. in America, and while the salts gave trouble in a steel wire process by clinging to the wire, thus clogging the dies, it was not the claim of Dr. Sargent, in his discussion of the matter, that the salts imparted any bad qualities to the materials of which the wire was composed.

In Germany, the method of heat-treating with metallic salt baths has been advanced to a high state of perfection, and it is believed there is no question of deterioration of the steel, as a result of contact with the salts. The author is indebted to Dr. Sargent for much valuable information on the subject, and it is believed it was to him the introduction of said method of heating, in America, must be accredited.

How to Use Metallic Salts

The equipment may be regarded in substance as an electric heater. The heater itself consists essentially of an iron container of suitable size, lined with asbestos brick, faced with fire clay. The cavity within is then filled with the salts and the electrodes are so placed as to require the electrical current to traverse the salts to form a connection; in other words, the circuit is completed by the salts between the electrodes. A pyrometer inserted in the molten salt bath shows the temperature of the bath and the steel immersed in the bath will take on the temperature of the same.

The electrodes are of iron, flat plates. The iron of the lowest carbon, soft Swedish iron, best serves the purpose. The electrical current is alternating about 50 periods, at about 190 volts electromotive force. It is at first necessary to melt the salts before the hardening process can be started and a path for the current, of lower resistance, must at first be provided. As soon as a molten streak is formed in the salts the process then proceeds without further difficulty.

The electrodes are electrolytically deposited to a slight extent and the deposit ultimately falls to the bottom of the bath, from whence they may be collected and disposed of. Mr. Schaeffers explains the action that is responsible for the iron on the bottom of the heater as follows:

"Atoms of chlorine and barium are set free at both electrodes, the chlorine combines with iron to form chloride of iron while the barium and iron are free." The iron being heavier than the liquid salts, falls to the bottom of the heater, from whence the excesses may be removed at will, while the salts are molten. The iron is simply scooped out of the molten bath.

The heat regulation is very simple, since by raising or lowering the voltage of the electrical current the current strength will fluctuate accordingly. The electrical energy is accordingly changed to suit the occasion in the manner as follows:

$W = E\,I = I^2Z = E^2/Z =$ Energy in watts.

In which:

$I =$ The square root of mean square current in amperes.

$E =$ The square root of mean square electromotive force in volts.

$Z =$ The impedance of the circuit, salts, between the electrodes.

It will not be necessary to go into the question here of the phenomena of the alternating current circuit in metallic salts bath, because the problem from the point of view of the heat treatment of steel does not demand exact knowledge of the details of the alternating circuit.

That the impedance Z will change with the temperature is true, but the means for varying the voltage being at hand and adequate for the purpose renders it unnecessary to investigate this phase of the subject.

With the increasing impedance it will be necessary to increase the electromotive force at a somewhat higher rate, because with the increasing temperature the heat losses will be more. The current strength should slightly increase then, and this will be at the expense of increasing voltage.

The heat equivalent of the electrical energy will be as follows:

$H = I^2\,Z\,t\,0.24 =$ small calories.

In which:

$t =$ time in seconds;
I and Z as before.

With means for ascertaining the heat equivalent of the electrical energy it is just as feasible to use the electrical current for the purpose as it would be to use any other source of heat. The electrical means of heating is the more convenient, because the heat is delivered to every molecule of the salts with great uniformity and the conditions are perfectly satisfied.

The cost of the electrical energy is not high in comparison with the service rendered. For a heater 6.25 by 6.25 by 7 inches the electrical energy consumption was reported as follows:

Temperature	Eenergy in kilowatts
880 degrees C	5.4 per hour
1,400 degrees C	8.5 per hour
1,300 degrees C	12.25 per hour

Besides the cost of the electrical energy there is the replacement of the iron electrodes, which is but a small item; then there is the replacement of the salts as they are volatilized. This is not a large

Note—The investigation of the metallic salts for this purpose was conducted in Germany by Mr. Joseph Schaeffers, M. E., Mem. S. A. E. and A. G. T. (Ger.) in 1906-7, for the author.

item, since the replacement will not exceed two pounds of barium salts per hour.

The inside of a heater, if it is a crucible, which would be very satisfactory, a clay pot, for the purpose, would last for an indefinitely long time, because, even if it were to split, the salts would seal the opening again and there is no other wear. The amount of hardening that can be done with an outfit of this sort will be very considerable, since the control is rapid and accurate. The pieces to be treated would quickly rise to the desired temperature in the bath, and to repeat the process would be a very simple thing to do.

Correct Temperature Observations

Any suitable pyrometer will serve to take temperatures. That the galvanometer used for noting the strength of the current should be "dead beat" and accurate goes without saying. Such outfits as the Le Chatalier pyrometer would serve admirably the purpose, with the proviso that a master galvanometer be available for use in checking the working instruments. This would be true with any system, moreover; the check instrument should be available even in small plants.

The check galvanometer should be sent to a testing laboratory at regular intervals to be calibrated, and it should be mounted in a suitable place during the period of its service. There are various types of galvanometers, among which is the D'Arsonval, all of which can be provided with a scale to read temperature degrees instead of angular deflections or milliamperes, as the case may be.

Facts on the Quenching Bath

If the means for heating are to be quick and accurate, surely the provision should be something besides a tub of dirty water. The several quenching baths are as follows, named in the order of merit: Mercury; acidulated water—ice cold; salt water—ice cold; salt water—normal; water; water and skim milk; lime water; fish oil; cod liver oil; cottonseed oil.

The mercury may not be used excepting for very small parts in view of the poisonous vapors it emits. The water quenches are more to make parts very hard, while the oils render parts tough and less hard. Double quenching is sometimes resorted to, the idea being to attain toughness and considerable hardness besides.

For quick work it is desirable to provide a means of maintaining the quenching baths at a constant temperature. There are diverse ways of accomplishing this feat, among which a pump to circulate the liquid and a cooler with a fan to abstract the heat from the same. The usual methods of cooling motor car motors would serve perfectly well.

Merit of Quenching Baths

There are various other ways of fitting up to accomplish the several ends. On the whole the idea has been to advocate even indirect heating, rather than to allow the parts to contact with the fire direct or for that matter with the heated products of combustion as in a muffle furnace. The muffle furnace is good, but the molten bath is better. The order of merit of the several methods then would seem to be as follows: Molten salt bath —electric heater; muffle furnace—gas heater, or oil; open forge—charcoal fire; bunsen burner—direct flame.

The forge is better than the bunsen burner because in the forge it is possible to cover the parts and to so urge the fire as to bring the parts up to the desired temperature slowly and more evenly than with the bunsen burner. Both methods are very defective from the point of view of the best results.

The quenching equipment should serve for the purpose, no matter what may be the means of heating. The annealing methods on the other hand can be varied, to suit the occasion and the materials. A bed of lime does very well; ashes serve for some purposes; allowing the parts to cool in a muffled furnace is still another way.

Tempering at temperatures below 350° Centigrade may well be done in oil. The parts may be placed in oil and the same can be gradually raised to the desired temperature; there to be held for the requisite period, depending upon the mass and quality of the material. If higher temperatures are demanded, the parts can be transferred to the molten salt bath; there to be raised to the desired temperature.

Tempering is a matter not always fully understood. The mere raising the temperature to some predetermined point is not likely to be productive of the anticipated results. If a part is very thin, of no great mass, it is possible to temper, draw the temper, by virtue of the mere application of the heat requisite to raise the temperature of the mass to the predetermined point. If, on the other hand, the mass is considerable and the section is more or less the same in all planes, a time factor must be introduced.

The time required to temper a piece depends upon the mass and upon the state in which the piece happens to be. It is equally a fact that some grades of steel will be more persistent than others. Nature hard steel—steel that habitually resides in the hard state—will not so readily consort with softness, as the products of the character "normally soft" and difficult to render hard.

Metal Baths and Their Utility

For tempering, the lead bath is sometimes used, or lead antimony may be employed. It is even possible to use alloys of the white metals to afford temperatures differing by quite small increments. In all such cases it is plain to be seen that to some extent, at any rate, the metal will adhere to the parts to be treated; thus becoming a nuisance.

MELTING POINT OF ALLOYS

Lead	Tin	Bismuth	Degrees Fahrenheit	Degrees Centigrade
1	1	1	250	106.8
2	2	2	292	103.2
3	3	1	310	140,2
4	4	1	320	144
6	1	0	381	167.55
1	2	0	441	210.75
1	3	0	482	233.10
1	5	0	511	249.05
1	10	0	541	265.55

These metal baths should be covered with charcoal powder else they will oxidize away very rapidly indeed. The exactness of the temperature depends upon the purity of the metal and the exactness of the proportions. The temperature will remain constant just so long as some of the metal is melting; temperature will raise after all is liquid, if heat is urged.

The melting point of the pure metals unalloyed would be as follows:

Lead .....618 degrees F. = 302.4 degrees C.
Tin .....446 degrees F. = 213.3 degrees C
Bismuth .....507 degrees F. = 246.8 degrees C.

Zinc would serve for a somewhat higher temperature if it could be used at all, but it would cling to the metal to be tempered with great tenacity. Lead alone affords a good means for tempering parts to be tough, but not file hard. Bismuth would, if used, result in considerable hardness of the quenched parts, in view of its comparatively low melting point. If the temperature of the molten metal is allowed to increase, after the metal is all dissolved, the poisonous vapors given off will be very detrimental to the health of the artificer, and it is a question if it is humane to allow work to be done regularly in this way.

At all events men who work around lead baths should be very careful not to inhale the fumes. The arrangement of the bath should be such as to have the fumes sucked up a "flue" by a suitable fan of good design. It is quite general to attempt to judge temperatures by color, but, as it is quite well appreciated by mostly every one connected with the art, to judge correctly is a difficult, if not an impossible, undertaking. The susceptibility of the "retina" of the eye of the observer to light, would be a fair constant in a place of "constant illumination," or in the dark under well-defined conditions, yet even so no two observers would reach the same conclusion. The generally accepted temperatures in relation to color may be set down as follows:

TEMPERATURES CORRESPONDING TO COLOR, M. POUILETT

High temperatures	Degrees
Incipient red heat.....	977 F. = 505 C.
Dull red heat.....	1,292 F. = 678 C.
Incipient cherry red.....	1,472 F. = 767 C.
Cherry red	1,652 F. = 866 C.
Clear cherry red.....	1,832 F. = 956 C.
Deep orange	2,022 F. = 1,180 C.
Clear orange	2,192 F. = 1,174 C.
White heat	2,372 F. = 1,273 C.
Bright white	2,252 F. = 1,372 C.
Dazzling white, maximum...	2,912 F. = 1,570 C.
Dazzling white, minimum...	2,732 F. = 1,470 C.

The melting point of steel depends upon the composition, as for illustration: The carbon has a marked effect upon the melting point. For each point of carbon

in the steel the melting point is lowered 1 degree Centigrade. On this account it is not possible to fix a definite temperature for the white heat bordering upon the melting point of the steel. The colors above set down are for products showing color due to high temperatures. Steel in the comparatively cold state will also show color consistent with its temper, and in tempering steel it is common practice to go by that color. It would be better, of course, to temper to a definite temperature by the pyrometer. The usual values accepted for the temper corresponding to color in comparatively cold steel may be set down as follows:

TEMPER COLORS

	Low temperatures Degrees
Deep orange	421 F = 200 C.
Orange	473 F. = 230 C.
Red	509 F. = 240 C.
Violet	531 F. = 260 C.
Indigo	550 F. = 270 C.
Blue	559 F. = 275 C.
Green	630 F. = 315 C.
Oxide gray	752 F. = 480 C.

The temperature in degrees Centigrade is given in round numbers for convenience; the error is but slight. In noting the temper color is it necessary to polish a spot on the steel? Different observers will reach different conclusions. A fair conclusion is but the result of experience. Temper colors will not develop excepting in the presence of air; moreover, the parts have to be bright to show the colors clearly. The colors do not develop always at the same temperature, because the steel is not always of the same composition. If the color shows readily in a given specimen of steel it will be a fair inference that the steel quenches to great hardness.

In some grades of steel the color will rub off readily. This will be in cases involving steel that does not quench to great hardness. The best temperature of quenching is the temperature that affords the requisite hardness. The lowest possible temperature should be taken in every case, allowing, of course, for the desired hardness. In tempering the reverse is generally true. The temper should be drawn at the highest temperature that will enable the steel to be used for the given purpose. In drawing the temper the mass of the pieces to be tempered must be taken into account. They must be left in the bath long enough to make sure that the steel is up to the temperature of the bath itself. Fixed instructions as to the time are not possible, because of the considerable differences in conditions.

For tempering, the bismuth bath affords the right temperature for a considerable variety of articles, as taps, dies, numerous tools of carbon, steel, and springs for some purposes. Certain animal oils serve the purpose also. In using the oil bath it is necessary to exclude the air or the oil will take fire. Burns from oil are particularly painful and even dangerous.

It might be well here to define what is meant by tempering. If by quenching we mean hardening, then by tempering we mean "drawing the temper," or, as they say, "letting down." On the other hand, it is not uncommon to say tempering is hardening—result of quenching—whence drawing the temper is the converse. The author argues that "temper" is a final condition, hence drawing the temper is in the act of tempering. Quenching, then, is not tempering, unless the parts are to remain as quenched. They never are left as quenched in practice, and it is not uncommon to say, "quenching and tempering," that is to say, "hardening and tempering," or hardening and subsequently annealing would amount to the same thing.

It is not the purpose of the author to struggle with the vagaries of the language used by mechanics more than to attempt clearness sufficient to render the meaning apparent and to avoid license, excepting when that same license will serve a useful end.

BRIEF BUSINESS ANNOUNCEMENTS

New York—The Marion-Overland Motor Co. has removed to 1657 Broadway.

Pittsburg, Pa.—The Bellefield Motor Co. has been appointed local representative for the Oakland.

Houston, Tex.—The Houston Motor Car Co. has been appointed agent for the Columbus electric.

Boston, Mass.—F. L. Sanford, of Worcester, has been added to the staff of the local branch of the Franklin Automobile Co.

Philadelphia, Pa.—W. R. Walton, manager of the branch of the Firestone Tire and Rubber Co., has added C. P. Saunders to his selling force.

Des Moines, Ia.—Earl V. Shue, who was recently appointed local agent for the Cadillac, expects to be installed in his new garage at 916 Walnut street very soon.

New York—J. A. Dwyer and P. Dooley have taken a lease of the property at Fifty-seventh street and Twelfth avenue for a term of 21 years, and will erect a building suitable for garage or factory purposes.

Lansing, Mich.—The Herreshoff Motor Co., of Detroit, has been incorporated with a capital stock of $90,000, and will engage in the manufacture of motor cars. The plant of the new company will be located at Harper avenue and Dequindre street, Detroit. Louis Mendelsohn is the president, C. F. Herreshoff, secretary, and Carl Reese, treasurer.

Detroit, Mich.—The National Motor Castings Co. has been incorporated with a capital stock of $14,000.

Columbus, O.—The Carrico Motor Co., of Cincinnati, has been incorporated with a capital stock of $30,000.

Los Angeles, Cal.—J. S. Conwell has severed his connection with the Auto Vehicle Co., and has been appointed agent for the Maxwell.

Philadelphia, Pa.—Morgan R. Davis has been appointed general manager of the Penn Motor Car Co., the local agent of the Mitchell car.

Denver, Col.—Fred B. Henderson has purchased the Palace stable property on Cheyenne place, between Fifteenth street and Broadway, and will remodel it as a garage.

St. Louis, Mo.—It has been rumored that H. M. Blake, president and manager of the Parkin & Orendorff Machinery Co., will be appointed manager of the local branch, which is to be opened by the Buick company here.

Sharpsburg, Ky.—Charles Gunther and J. E. Murdock, of Cleveland, O., have been making a survey of the locality for the purpose of establishing a motor bus line between this place, Winchester, North Middletown and Bethel. They represent a syndicate of Cleveland capitalists which, it is said, is at the head of sixty bus lines in various states.

Wilkinsburg, Pa.—F. A. Hunter, of the Hunter-Miller Co., has been appointed agent for the Marmon.

Detroit, Mich.—The C. E. Fear Automobile Co. is to open a salesroom at 844 Woodward avenue. The company has the agency for the Blomstrom.

Cleveland, O.—The Guide Motor Lamp Co., of 2060 E. Fourth street, has found it necessary to enlarge its capacity, and has also added to the sales department.

Jefferson City, Mo.—A charter has been granted to the Auto Livery Co., of St. Louis, which has a capital stock of $1,000, and will do a general hiring and repair business.

Pittsburg, Pa.—The Independent Tire Repair Works, of which H. E. Henderson is the manager, has taken over the business of the Dayton Airless Tire Co. The new concern has taken a lease of the second floor of the Globe Garage Co., at Ellsworth and College avenue, where it will locate its tire repair shop.

Philadelphia, Pa.—Monte Cross, shortstop of the Athletics, has decided to take up the motor car business as a sideline, and is now connected with the local Winton branch. Eventually he intends to take charge of a western agency, but for the present will devote all his attention to mastering the details of the business.

Legal Lights and Side Lights

ENFORCING BAY STATE LAWS

THE Massachusetts highway commission is proving to motorists in the Bay state that the motor laws are not to be trifled with and a close tab is being kept on the men handling cars. Motorists who are given to speeding are learning that when their cases are disposed of in court that does not always end it. Sometimes there follows a letter of warning from the commission. The commission made public a few days ago some facts and figures that should prove a warning to others. It showed that seventy licenses have been either revoked or suspended. Of this number twenty cases reached the commission after having been heard in court; eighteen cases were taken after an investigation by the commission, and thirty-two were accorded hearings by the board. Here is the tabulated list:

	Revoked	Suspended
Intoxication	6	..
Reckless operation	27	13
Taking machine without owner's consent	4	3
Unlicensed operator	1	..
Third conviction	..	1
Not stopping for officer	1	..
Operating after license was suspended	1	1
Improper operation	..	11
Incompetent	..	1
Totals	40	30

	Court record	Investigation	Hearing
Intoxication	4	1	1
Reckless operation	16	7	17
Taking machine without owner's consent	..	4	3
Unlicensed operator	..	..	1
Third conviction	..	1	..
Not stopping for officer	..	1	..
Operating after license was suspended	..	..	2
Improper operation	..	3	8
Incompetent	..	1	..
Totals	20	18	32

BUENOS AIRES' NEW LAWS

The city government of Buenos Aires has adopted new ordinances covering the use of motor cars in the capital of Argentina. These ordinances were rendered necessary by the increasing number of motor cars, both for private conveyances and public transport, which are more noticeable there than in other cities, owing to the narrow streets and congested state of traffic. Experienced drivers are given a fairly free hand as to speed, but must satisfy the authorities that they are competent by passing a suitable examination. They also are required to carry a duplicate pass book, containing their license, and blank pages, on which any accident or carelessness is to be recorded by the police. Persons under 18 years of age are only permitted to run cars up to 12 horsepower, and this only after passing a satisfactory examination. No mention is made of the regulations being applicable to private owners. As to the cars themselves, they must be provided with non-slipping tires. Acetylene searchlights are prohibited in the center of the city. Efficient brakes are to be used, and are to be tested at regular periods.

MUST HAVE MILE TRAPS

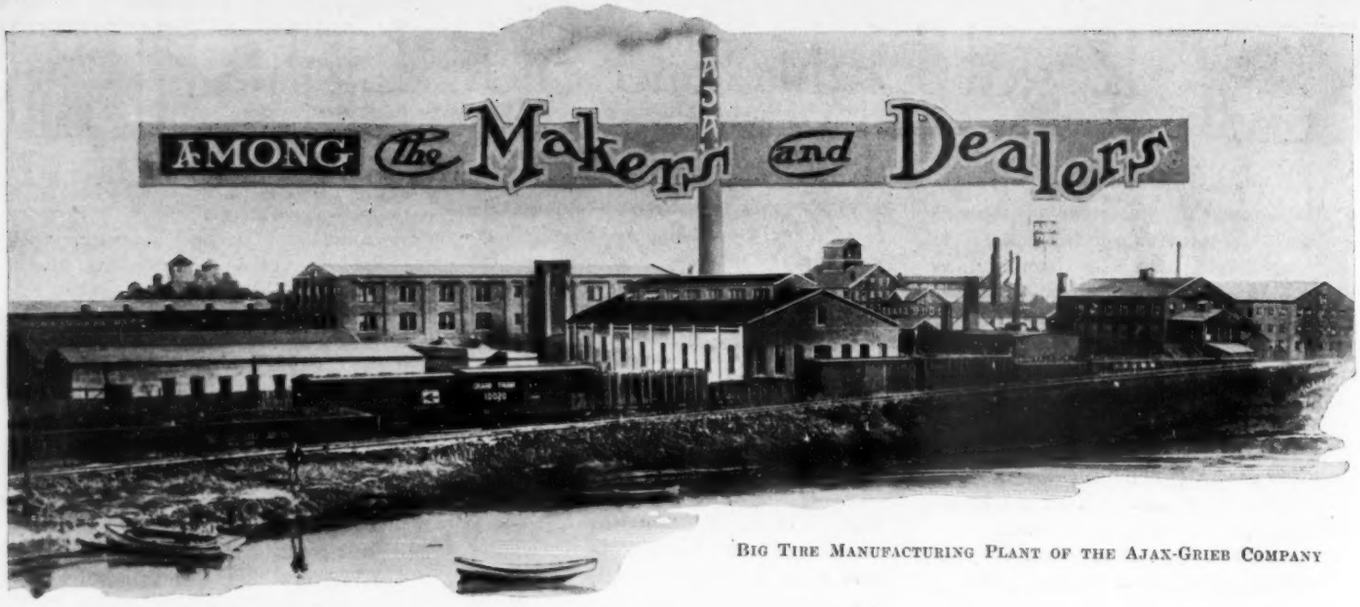
Things are certainly coming the way of the long-harassed Pennsylvania motorists—from a legal standpoint, at least. Only the other day Judge Weand, in Morristown, opined that arrests could not be made and fines levied upon a motorist simply because a more or less keen-sighted constable swears that a car bearing the numbers of the tag bought by him from the state highway department had broken the speed limit or otherwise offended at such and such a time; it must be proven that the owner was in the car at the time. And now Judge Sadler, in the Cumberland county court, at Carlisle, has handed down an equally revolutionary decision. Justice Thomas B. Wilson, of Eagleville, Montgomery county, caused his constable to arrest Albert E. Cauffman, chauffeur for Attorney John Kays, of Carlisle, for alleged fracturing of the speed limit over a measured ¼-mile stretch. Kays defended his chauffeur in the habeas corpus proceeding, and to the horror of the Montgomery county sleuths Judge Sadler in his opinion said it was necessary to give proof that 1 full mile—the distance distinctly specified in the law—had been traversed in less than 3 minutes in the open country, or in less than 6 minutes inside of borough limits. He accordingly discharged Caufman from custody. His honor pointed out that a speed rate based, say, on the time in which a 100-yard stretch was covered, would be but little more ridiculous than that upon a ¼-mile. Mile-long traps will be hard to operate, and the chances of the motorists discovering some of the numerous signalmen necessary to make it effective are greatly increased. Hence the jubilation of the motor cult in the hinterland beyond the confines of the Quaker City. It is they who have been grist for the numerous small justice mills in the towns and villages of Montgomery and Bucks counties. Another not unimportant point in Judge Sadler's decision was his insistence that justices located in a county where the speeding offense was alleged to have been committed have no right to issue warrants for service on alleged violators outside of that county, and that actions for speeding are civil or penal, rather than criminal and that the commonwealth cannot be a party to them.

PUNISHES DRUNKEN DRIVER

Judge Bishop, presiding in the superior court at Boston recently, took occasion to give a warning lesson to chauffeurs who believe they can drive cars recklessly and get away with it if they have friends who possess some influence, when he sentenced Benjamin Smith to 3 months in the house of correction on a charge of operating a car while under the influence of liquor. He was also fined $5 for drunkenness. The fact that he had people of influence on hand to plead for him and also had a letter in his behalf from Congressman Gardner, one of the big men in the Republican party, did not save him from jail. The facts in the case are these: Smith, who is about 25 years of age, took the motor car of his employer, Frederick H. Prince, of Boston, and started off on a trip September 15 last. He made some stops and drank liquor. While on the Revere beach boulevard he drove the car zigzag and finally smashed head on against a stone wall, wrecking the car, which cost $6,000. He was arrested and in the lower court fined $5 and sentenced to 3 months in jail. He appealed. His father is coachman for Congressman Gardner, and so Assistant United States District Attorney Mark Sullivan, who is a close friend of Mr. Gardner and the elder Smith, was secured to defend the young man. When the case came up in court Attorney Sullivan had on hand Judge Hayes, of Ipswich; Judge Norwood, of Hamilton; the three selectmen of Hamilton, the pastor of the church attended by Smith and the letter from Congressman Gardner, all of whom spoke favorably for the defendant. He was found guilty and Judge Bishop then passed sentence. He also refused to suspend sentence for a day as asked by the attorney who represented the defendant.

ST. LOUIS DECISION

One of the most important decisions affecting motorists during the present year was handed down by Judge Allen, of the criminal division of the circuit court, St. Louis, recently in that city in the case of State vs. John Newbauer, a chauffeur, who was charged with culpable negligence in running down Eddie Dean in St. Louis last June. After the state had finished its evidence the defense filed a demurrer setting forth that the prosecution had failed to prove that Newbauer's alleged carelessness was intentional. If this decision holds good it will be out of the question to convict motorists who have killed or injured pedestrians, as it is practically impossible to prove that an offender was intentionally negligent.



BIG TIRE MANUFACTURING PLANT OF THE AJAX-GRIEB COMPANY

Working Nights Again—The Speedwell Motor Car Co., of Dayton, O., is again running a night force in an endeavor to keep up with orders.

Tire Man Changes—D. B. Price, for the past 4 years New England traveling representative of the G & J Tire Co., resigned last week to accept a position with the Firestone Tire and Rubber Co. Mr. Price will be attached to the Boston branch but will travel through New England a great deal.

Winkley a Bostonian Now—Robert L. Winkley, for a number of years in charge of the publicity department of the Pope company, with headquarters in Hartford, has joined the Boston colony of motorists. He has opened a place at 221 Columbus avenue where he is the New England representative of the Matthews-Northup Co., of Buffalo.

Wall Joins Rockwell—E. J. Wall, for many years traffic manager of the Pope Mfg. Co., in Hartford, Conn., has severed his connection with the local concern and enters the service of C. P. Rockwell, formerly of Hartford but now New England manager for Thomas B. Jeffery & Co., of Boston. Mr. Wall leaves Hartford to accept a position as business manager of the Rockwell company.

Maxwell Laboratory Planned—A well-equipped technical laboratory will be erected in a new building that is being added to the Tarrytown factory of the Maxwell-Briscoe Motor Co. Though the laboratory will serve various ends its principal purpose is the carrying on of fuels tests. The Maxwell people have been experimenting with alcohol as motor fuel for some time, but the difficulty of finding a substance that can be produced cheap enough to make the substitution of alcohol commercially profitable has been the chief obstacle in the way of an adoption of alcohol for use in internal-combustion engines. The Maxwell people, after a series of experiments extending over 2 years, now claim to have succeeded in producing alcohol from sawdust at a manufacturing cost of 4 cents per gallon.

Oxford Handling Brush—The Oxford Automobile Co., 1615 Wellington street, Philadelphia, has secured the Brush agency for the Quaker City and contiguous territory. The new agents are preparing for an active campaign, and are already at work arranging for sub-agencies in the eastern section of Pennsylvania and nearby New Jersey.

New Face in Philly—The Standard Motor Co., 616-618 North Broad street, is the latest addition to Philadelphia's colony. William P. David, formerly of the Kelsey Motor Car Co., Maxwell and Mora agent, is at the head of the new concern, which will handle the Middleby car, a Reading, Pa., product, in the Quaker city and adjacent territory.

Veteran Tire Man Retires—F. O. Sawyer, 3910 Olive street, St. Louis, has disposed of his entire business to the Firestone Tire and Rubber Co., and will devote his attention to outside interests. The new branch has been placed in charge of John P. Trader and will be pneumatic tire distributing headquarters for Missouri, Oklahoma, Arkansas, Indian territory, Kansas and Texas.

Fuller Will Build—Plans have been drawn for the erection in Boston of a three-story building, 300 by 70 feet, with a basement, to be occupied as the mechanical department of the Packard and Cadillac agencies. Alvan T. Fuller, who represents them in the Hub, finds that even though his quarters in the Motor Mart are larger than any two or three other dealers, yet they are inadequate to his needs. So the new building will be erected on a lot to be selected in a few days. It will be to all intents and purposes a factory, for within its walls Mr. Fuller proposes to handle any sort of motor car work, including painting and machine work of all kinds. Mr. Fuller hopes to have the building ready for occupancy early in the spring.

Will Sell Bergman Pliers—The National Sales Corporation will act as factory sales manager to the motor car trade for the Bergman line of pliers.

Kalman in New Line—Paul J. Kalman, 805 Pioneer Press building, St. Paul, Minn., Northwestern railroad representative for the Detroit Seamless Steel Tubes Co., Detroit, Mich., is, in addition to the railroad business, now handling in St. Paul and Minneapolis, the full line of seamless steel tubing manufactured by that company, including stationary boiler flues and mechanical tubing for motor car construction and other purposes.

Jewel Branches Opened—The Forest City Motor Car Co. has opened a branch at 2174 to 2180 East Ninth street, Cleveland, O. This branch will be known as the Jewel Motor Car Co., of Cleveland, and will be under the management of O. F. Watts. The company also has opened a branch in New York city at 1662 Broadway, as the Jewel Motor Car Co., of New York. This branch will be under the management of J. P. Stoltz.

Franklin Agents for 1909—Sherman Dils is to be the Franklin dealer at Parkersburg, W. Va., during the 1909 season. At Minneapolis the Franklin will be handled by the Jordan Automobile Co. The Ohnhaus Automobile Co. will handle the Franklin at Fort Wayne, Ind. At Portland, Me., the line will be handled by the Harmon Automobile Co. The Sid Black Co., of Cincinnati, O., is representing the Franklin in that city. At Winnipeg, Manitoba, the Winnipeg Garage, Ltd., is the representative of the Franklin. At Pendleton, Ore., it is the Pendleton Automobile Co.; at Spokane, Wash., the Northwest Automobile Supply Co.; at Helena, Mont., the Swendeman Automobile Co.;

at Troy, N. Y., the Troy Automobile Exchange; at Griffin, Ga., G. W. Hanson. J. B. Moore, of Laconia, N. H., is on the list of Franklin dealers for 1909, and so is D. M. Jackson, at Warren, Pa.

Fritchle May Move Plant—The city of Indianapolis has its eyes on a new motor car manufacturing plant which will make the ninth one in the Hoosier capital. Negotiations are said to be pending with the Fritchle Automobile and Battery Co., of Denver, which is said to be seeking a location farther east. W. P. Pfaff of the company recently spent several days in Indianapolis looking over the city. Chicago and Philadelphia are also being considered favorably as the future home of the company.

Buys Big Plant—The Badger Brass Mfg. Co., of Kenosha, Wis., was the highest bidder for the entire assets of the Visible Typewriter Co., of Kenosha, at the trustee's sale in Milwaukee last week, and unless the referee in bankruptcy decides for the creditors in their appeal to have the sale set aside because the bid is much too low, the Badger company will get a plant representing an investment of $150,000 for $27,500. W. L. Yule, treasurer of the Badger company, made the bid. The assets consist of a fine factory and equipment, which was leased by the Earl Motor Car Co. after the Visible's failure, and is now being occupied by the Petrel Motor Car Co.

Pratt Pierce Sales Manager—The position of sales manager has been created by the George N. Pierce Co. Heretofore Charles Clifton has in addition to other duties attended to this branch of the business. Now, however, the development of trade in Pierce-Arrow cars requires a division of work. For the position of sales manager J. Elmer Pratt has been selected. Twenty-two years ago Mr. Pratt was traveling representative for Gormully & Jeffery in the bicycle business. Then he became president of the Grand Rapids Cycle Co. He was employed by the Cadillac Motor Car Co. from almost its very start, until about a year ago, when he went to the Buick Motor Co.

Will Build the "Wonder"—Charles F. Ettwein, of Kansas City, has incorporated, with $35,000 capital, a company to build cars like his Kansas City Wonder, with which he made two-thirds the distance in the 1,000-mile southwest reliability tour last September. The new firm, to be called the Wonder Mfg. Co., includes also L. A. Ettwein, a brother of the president, and H. N. Strait, of the Strait Mfg. Co., builder of steam Corliss engines in Kansas City. A building with 7,000 feet of floor space at 4116 Penn street has been leased and twenty-five men are to be put to work in December, after Mr. Ettwein has returned from a trip east to buy materials. It is stated that the new concern already has orders for 200 cars, which will be the first year's output. Two models are to be built. The "Wonder" has a two-cylinder horizontal engine under a bonnet in front, planetary transmission and shaft drive. It is mounted on 36-inch wheels. There is seating room for two and a wagon body similar to a horse-drawn spring wagon. The car attracted much interest on the reliability run.

New Industry at Anderson—A company to be known as the Fowler Auto Railway Car Co. is being organized at Anderson, Ind., by J. R. Fowler, of that city, and J. B. Fowler, of Los Angeles, Cal. The company will manufacture interurban railway cars equipped with motor car gasoline engines, instead of the usual electric trolley equipment.

Long Demonstrating Trip—A model 9-H Stoddard-Dayton, while on the first demonstrating trip, covered a route taking in Indianapolis, Chicago, Kalamazoo, Detroit, Toledo, Cleveland, Erie, Buffalo, Franklin, Pittsburg, Columbus and return to Dayton. The total mileage of this trip, including several demonstrations in each of the towns, was 2,164 miles, in which a total of 112 gallons of gasoline was consumed. This gives an average of 19.36 miles per gallon. The car was gone from Dayton 1 month.

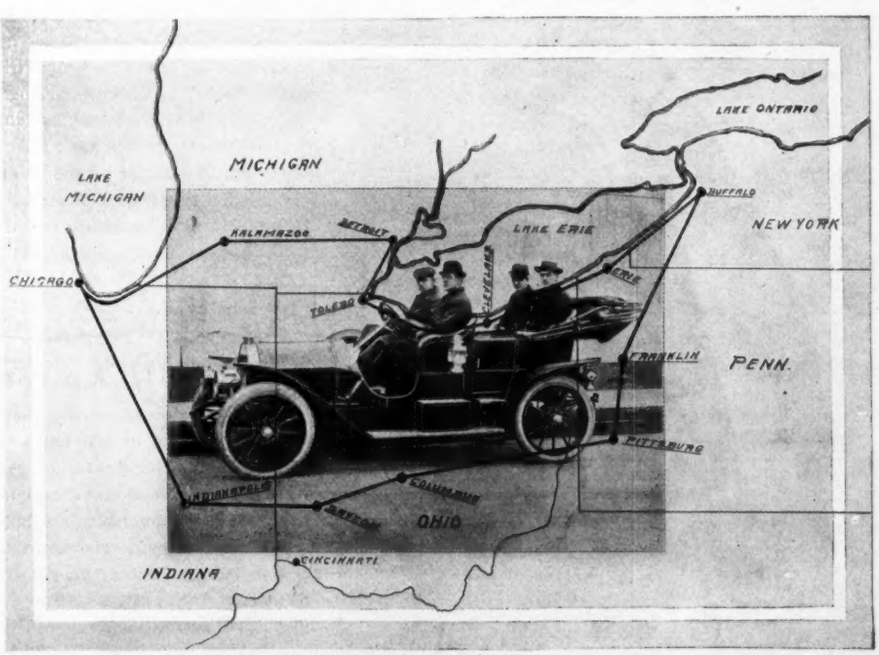
Maxwell After Foreign Trade—The purpose of the European trip of J. D. Maxwell, vice-president of the Maxwell-Briscoe Motor Co., is reported to be that of studying foreign trade conditions with a view to the possibilities of the exportation of Maxwell cars during the 1910 season. After making himself conversant with the requirements of the European market Mr. Maxwell will proceed to Mexico and other South American countries, in all of which the Maxwell people expect to find a ready market for their cars. In connection with this report the fact that the Maxwell-Briscoe Motor Co. contemplates the erection of a fourth factory near San Francisco assumes a most important aspect.

Handling Buicks—Evan Shelby, manager of the Sterling Electric Co., of La-Fayette, Ind., has opened a sales room, repair shop and garage, which is known as the Buick Automobile Agency, at 202-204 Market street, Crawfordsville, Ind.

Kansas City Changes—The Dey Motor Co. is rushing work on its garage. This firm will handle the Pierce. The Franklin Motor Co. is erecting a garage 120 by 165 feet on Main street and hopes to occupy it within a few months. Owners of Moon cars in Kansas City have formed the Moon Car Co., with Charles B. Merrill as manager. The location is 1527 Grand avenue.

Increasing Body Building Plant—The Racine Mfg. Co., of Racine, Wis., announces that the increased volume of its limousine, taxicab and coupe body business, in addition to its output of the regular open types, necessitates again enlarging its plant. Two large four-story brick buildings are just now ready for occupancy and foundations are being laid for a third new one. It is expected that several hundred more body builders will be given employment in the near future.

Plant Not Destroyed—Fire in the plant of the Syracuse Aluminum and Bronze Co. recently threatened to destroy the factory. The loss, however, was confined entirely to the office. The foundry was running in the afternoon and the next day all the men were at work and have been ever since. There was practically no interruption to the business, excepting considerable inconvenience in the office, due to loss of most of the records, etc. At the time of the fire the employes removed all of the patterns and a number of the moulding machines to a place of safety, and after the fire was out they were put back in place and work resumed.



MODEL 9-H STODDARD-DAYTON AND ROUTE FOLLOWED ON DEMONSTRATING TOUR.

How to Secure a Patent in Italy

EDITOR'S NOTE—This one of a series of articles on obtaining patents by H. G. Ward, Motar Age correspondent, Washington, D. C.

UNDER the patent laws of Italy the right to a patent is accorded the author of a new industrial invention or discovery, or his assignee. An invention is called "industrial" when it has directly for its object a product or result relating to industrial pursuits; an instrument, machine, tool, engine or any mechanical arrangement; a process or method of manufacture; a motor, or the application of any known power to industrial purposes; finally, the technical application of a scientific principle, provided immediate results in industry are obtained thereby. In the latter case the patent is limited solely to those results which are expressly pointed out by the inventor. A new invention or discovery in industry already patented abroad, although it may have been published pursuant to the provisions of foreign legislation, confers on its author, or on his assigns, the right of obtaining a patent in Italy, provided such patent be applied for before the expiration of the term of the foreign patent, and before others have freely imported and worked the same invention in Italy. The law also provides that any modification of a patented invention gives the right to a further patent, but without prejudice to the patent which already exists for the original invention.

Legal Rights of the Patent

The legal right to the exclusive use of an invention is contained in a certificate or "patent" delivered by the government. The patent does not guarantee the utility or reality of the invention as claimed by the petitioner, nor does it prove the existence of those properties which, according to law, an invention must possess in order to render the patent valid. The duration of an Italian patent can never exceed 15 years, nor be less than 1 year, always reckoning from the last day of one of the months of March, June, September or December, whichever next follows the day whereon the application is made, no account being taken of any fraction of a year. Italy grants three kinds of patents. The first is known as patents of invention, the duration of which is 1 to 15 years, as elected by the applicant. Patents granted for less than 15 years may be prolonged to the full term. "Patents of importation" comprise the second class, which is for new inventions already patented abroad. Their duration is the same as the foreign patent conceded for the longest term, without, however, exceeding the term of 15 years. The third class is for "patents of improvement," while the fourth class is for "patents of addition," which have the same duration as the principal patent to which they refer.

Patents of invention and importation pay a tax of $7.72 for the first 3 years, besides $1.93 per year indicated in the application for the patent; $12.545 for each of the years 4 to 6; $17.67 for each of the years 7 to 9; $22.195 for each of the years 10 to 12; $27.02 for each of the last 3 years. Patents of addition pay a single tax of $3.80. There is also a prolongation tax of $8, payable in addition to the annuities and proportional tax when it is desired to prolong the term of the patent originally taken for less than 15 years.

Some of the Formalities

The application for a patent must be addressed to the minister of agriculture, industry and commerce through the local prefecture or subprefecture. It must contain the name and Christian name, as well as the birthplace and residence of the applicant, and of his attorney, if there be one. It must further contain a statement of the discovery or invention in the form of a title which expresses shortly, but with precision, its characteristics and scope; a statement of the duration which the applicant desires to be assigned to his patent within the limits fixed by law. The application must be limited to one patent, and to one invention or discovery.

Every application must be accompanied by a description of the invention or discovery; the drawings, if any can be made, as well as the models, which the inventor may deem useful for the comprehension of his invention; the receipt for the payment into the public treasury of the fees due for the required patent; and a memorandum of the documents and objects delivered. In cases of patents of importation, the original foreign patent, or a legalized copy of the same must be included in the application.

Description in Italian or French

The description of the patent must be written in the Italian or French language, and must contain a clear and complete account of the details necessary for enabling a competent person to put the invention or discovery into operation. The application must be accompanied by three copies of the description and drawings, the applicant alone being responsible for the conformity of these copies. Whenever the description is accompanied by a model, the applicant is not exempt from annexing to the application, a drawing, or drawings, in duplicate of the entire model, or at least of those parts which constitute the invention.

The application and the three copies of the description must be written on paper stamped with 50 centimes. The description must be headed "Description of the invention having for title," etc. The drawings must be furnished in triplicate, one being on bristol board, in good black ink, for photographic reproduction, and two copies on tracing cloth. There are no fixed dimensions for the sheet. It is only essential that the figures shall not exceed 40 centimeters in any direction. Each sheet must have a 50-centime stamp.

No Preliminary Examination

The patent is granted without preliminary examination as to the novelty of the invention. The administration refuses the patent only if the application bears upon an invention in a class declared not patentable by law or if the filing has not been regularly effected. In case of refusal the applicant may within 15 days address a complaint to a special commission named each year by the minister of agriculture, industry and commerce. If the patent is granted for 5 years or less, the invention must be worked in Italy within 1 year from the date of the patent, and working must not be omitted for more than 1 year. If the patent is granted for more than 5 years, the invention must be worked within 2 years, and working must not be omitted for more than 2 years.

Uncle Sam Will Appeal

Washington, D. C., Nov. 30—The government has decided to take an appeal from the recent decision of the board of general appraisers holding that steel connecting rods, crank axles, crankshafts and similar parts, are dutiable at the rate of 35 per cent as forgings. It is the government's contention that importations of this character are dutiable as manufactures of metal at 45 per cent. The question has been up for nearly 2 years.